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JUNE 21, 1954

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Aviation Week

JUNE 21, 1954

WOL 16, No. 25

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Table of Contents on Page 8

USDA copies of the issue printed

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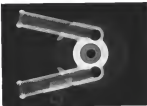
Radiographs made of pilot castings revealed a few recurring faults and indicated how a minor change in casting techniques could increase the yield.

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NEWS DIGEST

Domestic

Great Lakes Airlines DC-4 crash landed in Kansas last week at Gage, Okla. after an engine caught fire while the transport was flying through a thin stratus on a southeasterly New-York Seattle flight. All 75 persons aboard the burning plane escaped with out injury.

H. Lee White has resigned as Assistant Secretary of the Air Force, effective July 2.

Harry K. Coffey, 70, former chairman and former president of the National Aeronautic Association, was killed last week in a light-plane accident near Mt. Hood, Ore.

Pan American World Airways still intends to accept the three British Comet 7s it has on order if de Havilland Aircraft Co. works out the jet transport's troubles and gets U. S. certification of airworthiness, according to Wilbur L. Morrison, FAA executive vice president.

Helicopters never will equal the airplane in ton-mile efficiency, but Sikorsky told the Aviation Weeklies in Miami Beach. He listed three speed limitations for copiers: gun helicopters, 150-180 mph; conventional copiers, 200-180 mph; helicopter 180-160 mph. Preferring one of the conventional is limited Sikorsky said, because it is a rotating rotor (as in helicopter) and a rotor combined with an inefficient copier—"an airplane with a helicopter on its back."

Almost employment was down from 778,000 to 590,000, as Aircraft Industries Association spokesmen predicted. The industry currently is producing 900-1,000 planes a month, of which 50% are military, he says.

Ottavio C. Rossi Award will be presented to George E. Cooper and the Thomas H. Ross Award to Dr. Hal van G. Henshaw at the Institute for the Aeronautical Sciences' annual symposium dinner June 23 in Los Angeles. Cooper, assistant chief of flight operations at NACA's Ames Aeronautical Laboratory, won the 1954 Trophy for "outstanding guiding and research in aerospace and aerospace space." Henshaw, research engineer at Wright Air Development Center's equipment lab, will receive his award for developing the personal grade surface parachute.

Cessna Aircraft Co. has ordered 180 Javelin single-engine airplanes, designed



Bell Shows Details of 40-Passenger Copier

Bel's dandy (top photo) shows Bell Aircraft Corp.'s new 40-passenger copier configuration with rates of such weight would be the first test in Aviation Week (May 11, p. 16). Copier is in the thick wing's center, with engine located at each end (other Wright KH20s in PAWA KH20s) and pressure wing arrangement with cabin windows in the leading edge. Either power unit will drive both rotors. Landing gear is retractable. The wide center of gravity for landing, similar to that of modern designs, is an important consideration.

to prevent underbidding apples (Aviation Week May 24, 1953, p. 54), for heavy installation in the Model 170s and 180s. Javelin Aircraft Co. says its full output, possibly 10 a month, has been contacted by the Coast.

Deadly BDN's storm warning role will be evaluated by Pan American World Airways this summer, as a DC-6B (Aviation Week May 18, p. 128) in scheduled service to South America, Europe, Africa, the Middle East and the Orient.

As Penn. Assn. has set up an annual Earl T. Bunker Trophy for the Air National Guard pilot, honoring the former chief of the National Guard Bureau's Air Force Division. First recipient will be from California in Detroit's International Aviation Exposition July 26.

Arthur W. Watson has elected LeRoy Whitman, editor of the Army, Navy, Air Force Journal, president at its annual convention in Miami Beach. The record holder Ralph Platt of the Cleveland News. Other vice officers: David A. Weller, St. Louis Post-Dispatch; first vice president: Ross Wilcox, editor of Canadian Aviation, second vice president: Vern Hargrave, Associated Press, third vice president, Ralph H. McChesney, consulting engineer, secretary, and George P. McLaughlin, Air Digest, Indiana.

Piper Tri-Pacer airplane, equipped

with Eds Model 2000 floats, has been approved by Civil Aeronautics Administration.

Financial

Norfolk Aircraft, Inc., Hawthorne, Calif., reports consolidated net earnings of \$1,544,816 for the first nine months of fiscal 1954, compared with \$1,595,857 for the three-quarter period of 1953. Sales and other income dropped from \$155,286,993 to \$189,645,954. Backlog Apr. 30: \$579 million.

McDonnell Aircraft Corp., St. Louis, has paid additional federal income tax of \$19,508 plus \$996,558 in excess profits tax for the three fiscal years ended June 30, 1951, 1952 and 1953. The company says these payments are added from reduction of its own profits tax credit by a U. S. Treasury suit.

North American Aviation, Inc., Los Angeles, has declared a 50-cent quarterly dividend on capital stock, payable July 6 to holders of record June 22.

International

British REAF, which has purchased controlling interest in Aerovox Brazil, debenture finance with liabilities estimated at \$1.5 million. The price that was paid by REAF was \$20.8 million for 87%

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The Aviation Week

June 23, 1954

Headline News

U. S. Atomic Missile Mergers Seen...	22
MIT Polaris Approval Budget...	23
Swedish National Approval Program...	24
U. S. Test Program Needs Study...	25
Logan Group to See New Technique...	26
Atomic Missile Industry Moves...	27
A. A. Wiley Talks Western Flight...	28
Navy JET Engines Flying 5,000...	29
U.S. Navy Tests...	30
Defense Sets Up Industry Advisory Unit...	31
International Archer Tournament...	32
U. S. Submarine Force Expansion...	33
YTO Programs for Four Years...	34
Philippine Leaders Seek More Jobs...	35

Aeronautical Engineering

AF Gen XMB-4 Licensed Shifter...	36
Service Engine Production Drops...	37
AF Tests Work Test Motor...	38

Airviews

Panel Studies Atomic Problems...	39
U-2's Single-Engine Test Defuses...	40

Equipment

Pumper Pump Model of Jet Needs...	41
AF Getting Flying Trainer Sales...	42
Lockheed A-106 Top...	43

Air Transport

Search Wagon Passes But...	44
Passes A-106-45 Payload Boost...	45
Major in South America's Role...	46
A-106-45 Airline Program...	47

Editorial

Low Fares Via Military...	48
---------------------------	----

Departments

Newspaper...	49
Washington Roundup...	50
What's What...	51
Industry Observer...	52
Threat & Drug...	53
New Contracts...	54
Industry Comments...	55
FBI's Report...	56
U.S. News...	57
U.S. Air Force Production...	58
Also on the Market...	59
Engine...	60
Special Personnel...	61
Aviation Calendar...	62

Pictures Credits

—The Aircraft Corp. (A-106)...	63
—The Aircraft Corp. (A-106)...	64
—The Aircraft Corp. (A-106)...	65



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Washington Roundup

USAF Procurement Financing

Top USAF budget officials have revealed that USAF has received \$1,445 million in procurement funds that are left 1954 in the following categories:
* Contract completion—\$531 million
* Spent funds—\$151 million
* Free reimbursement—\$163 million

According to budgetary testimony before the Senate Appropriations Committee, USAF now expects to have a \$4-billion carryover in unobligated procurement funds from fiscal 1954 and from years into fiscal 1955. Of this total, some \$2.9 billion has not yet been allocated for any specific program, but \$2.1 billion is earmarked for specific procurement programs that have not yet entered into firm contractual obligations with industry.

USAF PIO Shift

Brig. Gen. Brooke T. Allen, Chief of Staff of the Military Air Transport Service, is scheduled to replace Maj. Gen. Ray Smith as chief of USAF public information.

Gen. Smith has served the largest Prototype team of any major military public information effort and has headed the aspect of the working group for his group and strategy. He entered the USAF headquarters in December in Deputy Chief in 1949 after serving as executive officer to the late Gen. H. H. Arnold, USAF Chief of Staff. Gen. Smith has been Director since 1950, serving through one of the shortest stints in USAF history.

Gen. Allen has been a pilot for 30 years, having served in public relations as head of the Air Postal Service.

Red Air Research

USAF, in a related release of its much criticized research contract with Harvard University for social studies in Russia, reveals the project was not as much of a borehole as some unbalanced socialist and legislative critics claimed during fiscal 1954 budget hearings. The Harvard study involved, among other things, research into the following problems faced by USAF as a war against Russia:

- * How can you destroy territories captured by air?
- * Can you control occupied territory by air alone?
- * How do you communicate with enemy leaders, urban populations and the people at large?
- * What could be the reaction of the Russian people to enemy types of USAF weapons?

USAF pointed out that, even before matters to their machine cannot be given by military planners without access to the knowledge of the USSR, being produced by the Harvard research contract.

Navy Korean Losses

Some idea of the high aircraft attrition losses suffered by United Nations forces in Korea can be gauged from a recent survey of Navy statistics. Navy's pre-Korea stock of aircraft recently diminished by 1,000 aircraft during the Korea war from 4,750 aircraft to about 680 at the present.

Vice Adm. Ralph Oyster, Deputy Chief of Naval Operations for Air, told the Senate Appropriations Committee that this 4,000-plane reserve was all the

Navy had to plug the gap between the constant demands of the Korean war and the low rate of production for new Navy aircraft during 1950-51.

Asiatic Showdown Looms

As prospects for direct U. S. intervention in the Indo-China war fade, the probability of a major military showdown with the Communists in Asia increases. U. S. Joint Chiefs of Staff still are pushing hard for military intervention in Asia presently with dispatch, but top-level political decisions are keeping the military on the back.

Meanwhile, initial air battles between Communist air MIG-15s and Chance Voughts yesterday proved U. S. Navy's air superiority to improve. Red air attacks on Formosa with the loss of 30-35 fighters; however, were based upon the Chinese report. The combat of Communist MIGs and Northcote F-101s upon high lights the technical superiority of the aircraft the U. S. has supplied to itself, both in Europe and Asia.

Official Use Only

Latest security classification measures at the Pentagon "Official Use Only" has replaced the "Restricted" category which was abolished recently by White House executive order. New Defense Department directives have also issued things not covered by the Eisenhower rule that still are "restricted in the public interest."

Now, these areas can be released only by a "responsible official" who first must determine that the query is based on "legitimate interest." Directive says there will be no "selective and unaccountable" withholding of information.

Leading Gear Tests

Branch of Aeronautics is leading a new effort to develop a post Navy Air Force specification on test methods to determine whether aircraft landing gear must design strength requirements. Under present regulations, Navy strength requirements to conduct tests by dropping in order airplane. USAF accepts static tests, conducted in special laboratory gear.

Baker's plans to revise Specification 38-10-21 are being delayed pending a possible agreement with USAF and contractors on a single standard.

Military Budget Rise?

Don't be surprised if the fiscal 1956 military budget exceeds the current Republican agreement trend and takes a sharp rise, particularly in aircraft procurement. However, if there is no shooting war in Asia, no increased aircraft procurement budget will be required next year simply to maintain and modernize the weapons force levels authorized by the Republicans for USAF, Navy, Marines and Army.

Fiscal 1955 budget requests for aircraft procurement were below this maximum maintenance requirement. Because the latest disclosure in military aircraft production revealed the Republican Administration's Russia procurement from funds previously appropriated by the Democrats and this held requests for new procurement funds to a minimum level.

—Washington staff

U.S. Turbine Program Needs Push

By Robert Hotz

Organization of a post industry-wide technology program to stimulate development of American aerospace powerplants is being discussed seriously in top-level scientific circles.

The research engine program would be aimed at doing the job for general aircraft development that the research aircraft program—initially sponsored by USAF, Navy, National Advisory Committee for Aeronautics and defense manufacturers—did in the 1950s by accumulating experience in turbine design data during the post decade.

Top turbine support for the research engine program is being thrust by a finding among top military and defense manufacturing institutions that the United States is lagging behind both Britain and Russia in the development of new turbine engines for their fleets capable of propelling an aircraft at Mach 2 even without stage to power military missions.

Many of these technicians feel strongly that developing powerplants for sustained flight at Mach 2 is the most serious problem confronting the scientists of U.S. aerospace today.

"This problem is complicated further by the opinion that the traditional field of engine development in aerospace is entering rapidly in the aerospace realm because of the impact of gas turbine development by the highest research effort programs. Veterans of the program and aircraft program emphasize that the requirements of sustained flight have increased radically the importance of the concept in relation to the aircraft. The research development of the engine in relation to powerplant in sustained flight has increased in importance, with the engine and its hot system becoming the dominant design consideration."

Discussions of the research engine program are rapid lately with civilian circles of the American aerospace industry's current approach to its development problems. Criticisms of the engine development technique include:

- Failure to obtain adequately the results of recent scientific research in the gas turbine field.
- Application of the research concepts to the problem of supersonic powerplants.
- Concentration on developing universally applicable engine instead of specific types tailored to specific aircraft, and as a result, the absence of referring tests (general) in the Mach 2 speed range.

- Concentration on an evolutionary development of gas turbine engines when a revolutionary jump in performance is actually needed to maintain the pace of the international aerospace competition.
- Failure to recognize the fundamental changes in the nature of turbine and engine manufacturers required by the problems of sustained and sustained supersonic flight.

"Assessing jet engine manufacturers are dropping their feet on applying the results of gas turbine research data during the past five years," says an engine designer with considerable experience in developing supersonic turbines told Aviation Week.

"The German had sustained turbine blades operating at World War II but there isn't an American jet engine today that attained the type of blade and the resulting high turbine inlet gas temperature," he said.

• **Name Endorsement**—A more sustained viewpoint was expressed by a top gas turbine research expert, who told Aviation Week.

"Engine manufacturers, both in this country and abroad, are following up on these research leads in their component development work. In this case, however, however, the research work is somewhat important with production considerations that may slow down to prevent the rapid rate of progress we so intensely expect."

"The engine industry is still thinking in terms of a turbine which is a separate problem and another turbine design." "We found out in the engine business that you have to work your turbine into what you're trying to work with operators. The engine industry will have to learn that lesson before they get any far."

• **Objectives**—The research program for government-funded research engine, to be initiated by the end of 1965, after the pattern of the highest research program that produced the Bell X-1 series and the Douglas D-558 series, would be required to accomplish the following objectives:

- Allow broader exploitation of the powerplant spectrum for highest speed flight. Chairman emphasizes that U.S. development now often blocks data such planning development in other areas and beyond turbojets.
- Allow the engine industry to launch out into new design concepts without the agency to make these concepts into a "hard and brittle" production engine, and without the alternative of referring tests (general) per after the industrial design.

- Speed the engine development cycle by applying laboratory proved ideas to specific whole engine concepts. Researcher this would provide a method of budgeting the experimental development cycle between the laboratory and the successfully operational engine.
- Help the engine industry to cut down the current wide lead time gap between turbine and powerplant development cycles by getting radically advanced engine development financed and underway long before the turbine parts that eventually will use them begin their development cycle.
- Regime Life—Research engine would be tested at a relatively short life after considerable development data could be obtained from a 14 to 15 hr engine life. Most research engine research in this country now is concentrated on component development.

The research engine would provide an opportunity for the vital task of studying concepts to get the engine performance in the speed and altitude range required.

One of the major problems in supersonic powerplant development is the resistance to getting such engines to operate over a speed and altitude range from ranging from low speed take-off and landing at sea level to Mach 2 level flight at altitudes over 50,000 ft.

Presently, the research engine program emphasizes that it would give the engine manufacturers more freedom in their development work with the economy to guarantee service production and production model.

They believe the research engine manufacturers currently to turn all development work into successful level and better production engine development from their abandoning the conventional approach and conducting the revolutionary changes already apparent on the engine development program.

USAF Wins A-Bomb Special Delivery Meet

Nellis ABX, Nev.—The 12 best overall team, representing eight leading manufacturers, competed here in USAF's first jet fighter gunners and weapon meet.

U.S. Air Force in Europe took the honors in the atomic bomb "pencil delivery" event, winning out team up against the Strategic Air Command Fair Air Force and the Tactical Air Command.

All four teams flew Republic F-84G Thunderjets in the A locally competition, closed to the public and press throughout the one-day run.

• **Overall Winner**—TRC was overall winner, scoring 5,133 points out of a possible 5,600.



BOEING 502-18, showing gas producer section at right, power output section at left

Copter Group to See New Turbine

A new small gas turbine engine, capable of 275 hp at takeoff, will be exhibited by Boeing Aerospace Co. this week at the 10th annual forum of the American Helicopter Society in Wash. region, D.C.

The 320-hp, dual-shafted Boeing Model 502-30 turbine, has a rated output power of 240 hp at 2,000 rpm. Fuel consumption is 275 lb per hour, less than that of its predecessor, Model 502-2, which had a rated output power of 175 and rated horsepower of 130.

• **Five Turbos**—Improved power and efficiency are achieved in the new unit, according to Boeing engineers, by better turbine and compressor designs. First test article of the compressor has been received.

Like Model 502-2, the new engine is a "free" turbine with no direct mechanical connection between the gas producer and the power output section. Only a duct that confines the flow of gases from the gas producer to the power section provides a link between the two sections.

The gas producer includes the compressor turbine rotor, burner and the accessory drive section. The output section includes the free-shafting power turbine, reduction gear and the output shaft.

• **Copter Application**—Initial display of the 502-10 at the helicopter society meeting indicates that Boeing hopes the new engine will find application in the rotary wing field.

The engine weighs less than 300 lb of the type largest in the Kerosene K125. Early this year, in another Kerosene experiment, a two-engine model of the 502-2 turbine was made on the HTRF helicopter (Aviation Week June 7, p. 14).

Scholar's firm, in 832 S. 10th St., is working with the French Army on a turbine (Aviation Week Feb. 22, p. 22).

Use of turbines on helicopters offers advantages of light weight, high power and small volume. Model 502-10 requires only 15 in. ft with a shifter installed on the shaft. Dependence on high rate of fuel consumption, although Boeing engineers say their engine also operates on any type of fuel from diesel oil to gasoline.

The 320-hp turbine is still in development but has been tested in operation as a helicopter, light plane and truck. Most recent modification was by the Navy in an LCMV (landing craft vehicle) for a concept that is only for first trial.

A General L-19 powered by a 350-hp turbine holds the world altitude record for light planes—71,561 ft.

KLM Wins Operating Rights in Philippines

(McGraw-Hill World News)

Manila—KLM Royal Dutch Airlines has won permission to operate passenger flights to and from Manila, becoming the first foreign carrier to take on as Philippine Air Lines' suspension of its international services (Aviation Week Aug. 5, p. 11).

The government has authorized KLM to exercise Third, Fourth and Fifth Freedom rights in Manila in operation of its service from Amsterdam to the Philippine capital via Frankfurt, Rome, Munich, Beirut, Karachi and Bangkok.

These flights are limited to two a week in either direction.

Manila, Air France has asked per-

mission to take on and extend passenger and cargo to the Philippines in an effort to attract its Constellation service from Saigon to Tokyo via Manila.

Subsidy Cuts

- CAB gets \$40 million for airline payments.

- But Congress prepares data for new showdown.

Congress has prepared a major showdown on airline subsidies and subsidies.

The Senate voted Civil Aeronautics Board \$40 million for subsidy payments, the amount already approved by the House. This, plus an \$18 million carry-over, will be allocated to make payments at the estimated rate of \$6.7 million monthly from July 1 to February.

Meanwhile, the Appropriations Committee of both houses will gather data on subsidies for the fiscal year 1955. The Board asked for \$73 million for fiscal 1955. With the resources this would provide more than 350 million for payments to carriers.

• **Cat Deliberate**—There was no session for Senate to grant CAB its full request. The \$40 million appropriated by the Appropriations Committee was accepted after debate of an amendment to reduce it to \$33 million by limiting automatic subsidies.

Sponsored by Sen. John Kennedy and Paul Douglas, the amendment would have limited payments to \$15 million, or \$11 million monthly on the maximum period.

CAB estimates a requirement of \$41 million monthly for international subsidies over the coming year. Kennedy said he would like to see the \$10 million additional cut. He was opposed by Sen. Styles Bridges, Hurler Kilgore, Warren Magnuson, Pat McClellan and Ed Butler.

• **GHF Effects**—Bridges pointed out that by next year Congress will be in a position to weigh the effects of two actions affecting airline subsidies. The Senate will vote on the amendment to limit subsidies of one billion with profit of another decision by the Administration's policy of eliminating automatic subsidies.

"Because of these two factors," he said, "the question now in the CAB will be what amount is under the control rate of making payments. Thus we requested CAB to appear before the committee in January."

- **Study Planned**—Kilgore, one of the most outspoken critics of airline sub-

bow door on a single level extension by bulkheads. This was achieved by placing the entire fire armight over on a higher deck in the bow than in the R1Y1.

Elimination of bulkheads from the main cabin was made possible by a multibed arrangement of vertical bulkheads that extend upward into the floor level while blocking the bulk off into many cells.

The main deck is made of uncurved magnesium for strength without excessive weight.

Asaphical Operations—Great changes that General and the Navy began work on the new weapons system after the first atomic bomb was dropped on Japan. It then became obvious, he says, that the vast amphibious assault at World War II could never take place again.

Mobility and dispersion now are required for protection from nuclear attack, he asserts.

"Airships do not fit into this picture for they automatically concentrate forces," Short says.

General therefore has concentrated on eliminating the design from amphibious-type operations, he reports. These General aircraft fit into this new concept vehicle.

RF2Y Sea Dart, represents amphibious fighter that can base on an aircraft carrier without requiring an airstrip.

RF2Y-1 Peacock, a vertical takeoff fighter that can operate from assault ships at low altitude.

RF2Y-1 and **RF2Y-2** interceptors for water-based logistic support.

The RF2Y-2, which requires no lift deck and can take off vertically into a launch, is the "ultimate in the transportation of goods," Short comments.

The bow loader is equipped with a water landing system to that an RF2Y-2 can be landed straight into the beach during unloading operations. Up to 40% of the approximately 27,000 lb of the four Allison 180 engines can be employed in rescue float to back the assault off the beach after unloading.

First Flight—The RF2Y-1 can transport all of the equipment of a Marine division with the exception of the four M-26 tank. It can carry four 155-mm howitzers, three two-and-a-half-ton trucks, an engine in two half loads.

The bow loader can be fitted with 107 mm rocket launchers for transport operations or with 92 tubes for hospital evacuation use.

Both versions of the RF2Y are air conditioned and pressurized.

Some of the original Navy studies made for RF2Y Transdevs have been converted to the RF2Y-2 bow loader version. Part of these is scheduled for initial flight soon.

Labor Demands

- **IAM to ask 35-hr. week for aircraft employees.**
- **Union also wants higher wages, fringe benefits.**

What aircraft manufacturers can expect as the way of labor demands when contracts come up for renewal next fall was partly well outlined at an International Association of Machinists (IAM) meeting this month at Atlanta, Ga.

The union will demand a 35-hour work week with no reduction in pay, plus substantial wage increases and fringe benefits.

Other Demands—The IAM is not ready to tip its hand yet on figures in connection with "substantial" wage increases, but they outlined some other demands that will be made on management.

Laborated vacation and holiday programs. The union will ask for eight paid holidays in a calendar year: Jan. 1, Feb. 27, Memorial Day, July 4, Labor Day, Thanksgiving and New Year's, and Christmas. Vacation demand one hour vacation for every 20 hours worked.

Medical and health programs to be paid in full by employers in some where permitted by state law (California has more than 5% participation by the worker).

Elimination of job-evaluation formulas as the means of determining how much a job is worth. The union wants pay scales set according to job description and not by the present point system formulas.

IAM is shooting for a nationwide agreement similar to the contract recently concluded between Local 509 and Spartan Aircraft Co., Ft. Worth, Okla., that guarantees the company from anti-trust suits job descriptions in modifying old ones, unless and until such as agreed to by the union.

The IAM that far is not ready to go to the suit over attachment benefits or guaranteed renewal wages.

170 Delegates Attend—The IAM meeting was sponsored by District 13, comprising eight for Lockheed-Martin, 11,500 employees, and was attended by 150 delegates representing the bulk of the aircraft industry's union workers. It was the third annual International Aircraft Guild Missile Conference of the union.

Chief business of the three-day session was to set demands that will be made in the fall when a majority of union contracts with aircraft companies are up for renewal.

Jose C. McClellan, Atlanta IAM industrial vice president, was the cheerleader.

work week would result in signing full employment in the aircraft industry. Based on union figures, the industry now is employing only about 80% of the professional aircraft workers available.

How Union Figures—The IAM says, for instance, that dropping back from the current 40-hour-a-week overtime work to a 35-hour overtime week at Lockheed-Martin, would require the company to hire additional employees to meet production schedules.

They would pick up the 500 odd dropped since last fall, plus about 1,000 more. Cost to most buyers would be considerably greater but would be offset slightly with reduction of overtime, the union argues.

Industry as other aircraft companies would be bound to take similar steps, union officers figure the total number of aircraft workers would be increased some 15% at least. That it would result in a larger force of skilled aircraft workers in event of an emergency. At that time, the union reluctantly would revert to the 40-hour week.

Delegates at the meeting—business agents and chief officers—represented districts and local having contracts with Douglas, Lockheed, General Electric, United Aircraft, Republic, Pratt & Whitney, McDonnell, and Convair. Delegates were present from A. V. Roe Canada, Ltd., and Convair.

Hughes Expands F-98 Guided Missile Plant

Hughes Aircraft Co. is spending \$1,515,000 to expand its guided missile plant at Tucson, Ariz., a project calling for 21 buildings on a space side at Tucson.

This will bring to more than \$14 million the amount the government has allotted Hughes plants at Tucson for construction of the F-98 Falcon, its six missile carried by Convair's delivery RF-102.

As part of the new development, the 12 buildings will include three long concrete, brick and concrete block plants. One will be 540x10 ft., another 200x10 ft., and a third 300x10 ft. There also will be 12 poured-concrete open yards in the area.

The Hughes plant is adjacent to sprawling Davis-Monthan Air Force Base, home of B-47 squadrons and jet interceptors. It also is accessible to Ft. Huachuca, site of the new Signal Corps electronics proving ground.

The Tucson plant plant plant has a work force of nearly 3,000. Present plant of Hughes aircraft is at Culver City, Calif. Hughes is said to have an air defense response backlog of \$600 million.

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last issue. Otherwise, the fact of more committee may be called upon to help settle a major question involving the affordability of advertising costs on a defense contract.

The existing regulations sets such costs are affordable among other costs, when the advertising is placed on a technical or back journal that distributes valuable information to the industry, and a question of private financial support for the publication. As the suggested revision to Section 15 have been passed by committee, the question has been decided and now, it is understood, signed in the regulations.

Policy Recommendations—Webster's office indicated that none of the current questions would be decided by the new control system. Personnel Regulation Advisory Committee.

PLA's announcement of the committee's makeup and the group will provide advice and recommendations to the Assistant Secretary of Defense on matters of board policy and on important aspects of procurement and production in that pertaining to the Department of Defense.

International Airline Transactions Gain 12%

Higher traffic volume on international routes was the principal factor in producing an increase of nearly 12% in the value of world airline transactions handled by International Air Transport Ass'n's clearing house during the year's first quarter.

IATA reports total transactions cleared during the first three months of 1954 amounted to \$59,518,906, compared with \$52,558,900 for the first quarter of 1953.

Member companies for Wilton, P. Haddock IATA director general, attribute part of the increase to the larger number of airlines that used the clearing house during the quarter. Member who entered in 45 with the addition of Midway Airlines, Ltd. in March.

Loss other carriers added during January were Aeroco, Ltd., Air Viet Nam, Japan Air Lines and Japline. The Aero Transport. These new carriers, however, were offset by the increased total income. IATA officials say.

Turnover Gains—Monthly turnover during the quarter, compared with the same period of last year. January, \$18,735,980, a 17% gain. February, \$16,505,060, higher by 6.8% and March, \$21,641,500, up 23.0%.

Telephone transactions cleared out through the U.S. Clearing House, in which substantial settlement is accomplished by U.S. domestic airlines, totaled \$2,278,800 during the first quarter as against \$1,112,000 in 1953.



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CONSHOHOCKEN, PENNSYLVANIA

资料来源：根据《中国统计年鉴》、《中国农村统计年鉴》和《中国人口统计年鉴》整理。

Aircraft manufacturers who want to dip in business will get the chance, according to the Air Force, but they must face the challenge of real competition to do it.

Forecasting 1955 based year budget estimates to the Senate Committee on Appropriations, Hag Don Thomas; P. Gentry, USAF director of procurement and production engineering, and the Air Force intends "to maintain a reasonable distribution of business throughout the aircraft industry by encouraging those contractors having the largest amount of business to subcontract work to the maximum extent practicable, thereby providing other contractors with low-dollar business an opportunity to participate on a cost effective basis."

Gentry made it clear that efficiency would be the prime consideration in "offering to all business, enterprise, large and small, full opportunity to produce those items we require."

He said USAF encourages small business but added that "we will not compete in negotiation and multiple award selection processes."

The statement stood in contrast to a growing trend among aircraft manufacturers to cut down on subcontracting. With industry propped by USAF for parts economy and continually made more conscious of competition, observers do not expect to see the trend reverse.

General feeling in the industry is that efficient spending will be rewarded with contracts, even if they are forced out as paper contractors.



Copter on Sub

Small amphibious Puma HU-16 helicopter has landed on the aft deck of a submarine, pointing its rotor wing craft slowly to move fast south. This craft belongs to West Coast Navy helicopter squadron HUH-1 which handles utility missions with the Pacific Fleet.



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CONV AIR XFY-1 begins power hoist for tethered tests, then...



...LAYS OFF VERTICALLY at a rate of 1 to 4 ft. per sec. ...



TEST PILOT Coleman slides into cockpit

Convair VTO Fighter

By William J. Conklin

Moffett Field, Calif.—Convair's spin-between XFY-1 vertical-takeoff fighter was poised for free-flight tests last week after more than 70 "harness" tests during which the striding, non-rotating (Aviation Week, Mar. 22 p. 14) actually flew inside a giant Navy hangar lounge.

Newsmen watched pilot J. F. (Skip) Coleman make three vertical takeoffs and landings during a press demonstration here June 2. Although still in its normal landing gear, the XFY-1 "Flying Pogo stick" seemed as lit as control from the dark robes.

The aircraft was control under the control of the pilot as he crouched in his 180-degree seat, the harness weight off the lower floor climbed slowly to a height of 40 ft., demonstrated its maneuverability in the vertical position, then descended gently to a brilliant landing.

Coleman planned to move the plane outside the Moffett Field lounge following the XFY-1's "leashed" tests. He said the robes were control tethered tests with the next lounge tests were more useful to check command handling characteristics.

► Good Maneuverability—During the

press demonstration, Coleman directed the silver lights at the end of its leads with an ease that indicated very good maneuverability in the strange rescue position. He maneuvered freely about the lounge in the fastest possible within the 60 deg zone that laid its eyes at the cable zone 134 ft. above the lounge floor.

His strange seat looked like a box made the rest lounge built to house the Douglas USS Macan and Alton. Coleman climbed a yellow ladder to the cockpit and stepped into the seat, which was tilted out and at an angle for improved visibility. The seat is electrically controlled by a cockpit switch. He sat crouched about 18 in. to the cockpit as he worked into the second position.

"You don't fly this one by the seat of your pants," he says. "You fly by the back of your neck."

► Power On—After a cockpit check, he reached forward to the engine controls and the status of the Allison YT40-A-14 began to shine. The Convair-Wright Turbo-Propeller contra-rotating propellers turned sluggishly as the plane dropped into a run.

The plane dived almost to a standstill and then began spinning rapidly as Coleman engaged the hubless. He



MANEUVER to the front of its cables under the lounge roof, ...



...RETURNS BACK to tethered landing on its last also view

Prepares for First Free-Flight Tests

Exited into the stator leads with a cockpit control and carefully checked over his instrument panel.

Looking down and off to his left wingtip, the Convair pilot slowly moved his thumbs forward until almost completely, its flow long also stretch length using, the XFY-1 began to rise. The seat increased until the shoulder of the tailplane engine, with its 5,500 static hp, shook the lounge.

Then slowly—with the attitude control—speed propeller spinning at 1,000 rpm—the flow small wheels lifted off the lounge floor and the XFY-1 lights dimmed at a rate of 24 ft. rise off to the right and to a height of 30-60 ft.

From position under the roof skid streamers could see Coleman keeping the control stick in almost constant motion as he maneuvered to the limits of the cables on each side, turning back and forth in a 180 deg. to demonstrate the ease of handling.

After four minutes in the air he lowered the flying in a loiter with landing as the circle marked on the lounge floor. Two control stands and landings followed.

Only once did Coleman signal he was from the tethering device and that was after one of the cables to the tail

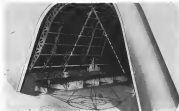
boom engaged on a pulley wheel and accidentally disconnected the "Pogo stick" during the radio demonstration.

► Conventional Controls—Although he spent some hours flying helicopters in preparation for his assignment, Coleman—who calls himself the "most prepared pilot in the world"—says he does

not believe such training will be necessary for pilot transition from conventional aircraft.

He explains that the controls are conventional in every sense. If the pilot wishes to land the nose "up," he pulls back on the stick, even though the position of the aircraft may be vertical.

"With nose down as in the air, it



CARL: BIG is shown in artist's drawing. Below line control maneuverability over



RAN-100NNA, developed by Allison for VTOL engine testing, death angel.



1832 DYKEX rotates 90 deg. on two large bearings to retract or retract propellers.

ent always can but it was expected to find that when you are reconfiguring you don't enter the intended position," Colosimo says.

It is easy to trim the VTO fighter even in the vertical position, the Colosimo pilot reports, adding that he has flown it for short periods with his feet outside of the cockpit.

•Tailfining Re-Config as Looked Overboard. The tail fin, designed when outlined for use in the horizontal position, the Colosimo aircraft could be retracted from the first only in vertical flight.

For this reason, the tail finning was devised to enable Colosimo to make his initial flight within the prototyping network of cables. These could retract the external cable in event of loss of control or prevent it dropping to the concrete lower floor if the engine failed.

The wires basically a mode up of cables among pulleys and loaded into a drive controlled by an electric motor and brake. A counter weight running on a track down one wall of the hangar kept the cable cables taut to prevent propeller loading when the aircraft was being under its own power.

During these so-called "horizontal," vertical cable on from the tips of the VTO's wings and lead through a tension regulator and up the wall to the bottom of the counterweight.

Second safety devices were built into the system. If the plane dropped at more than the preset speed of 5.5 ft/sec, a warning mechanism attached to the drum cut in the brake and halted the winding cable. The same control went into operation if the plane dropped within 95 ft of the floor.

In order to recover the landing gear during takeoff, the landing gear could be retracted automatically when the aircraft was within 30 ft of the floor. In later testing this cable was

known to prevent the plane to land anywhere on the larger floor that was within the lev. of its operating zone.

The ng, built in Southern Flyp among the Contractors Co. of Long Beach, Calif., not only permitted vertical takeoffs and landings but also testing in the vertical attitude within a 270 deg. arc. The longer longer than a CV type aircraft carrier, offered a vast unobstructed area for the vehicle flights. Built in 1971 to shelter the rescue Moon at a 1,111 ft long, 305 ft wide and 198 ft high.

•Modified Engine—Allison representative Guilford C. Deane reports the XTF-1 Allison engine will develop 7,100 hp at maximum velocity, although it is rated at 5,500 equivalent shaft hp, when the lighter is class. This, he says, is about three to five every pound of engine weight.

Allison faced two problems in adapting the T48 turbojet engine for the 190-lb. VTO fighter, Deane comments. These were:

•Recessed structure for the engine to operate vertically in both the vertical and horizontal positions.

•Presence of controls, cables, sensors in the critical takeoff and landing periods.

Major changes were in the takeoff gear system. Of pumps, lines and bearings of the T48 were removed. Redundant gear was modified, given higher propeller reduction and increasing the thrust. The control system was reworked. Large size of the propellers also made it necessary to change the procedures for starting the engine.

A model test stand was built in the Allison plant at Indianapolis to accommodate VTO engine in either vertical or horizontal position. Work on the prototype engine was begun in 1970, and engine tests began at Allison's Plant 2 in November 1972.

13. VTO-1/4 now has legal room (100,000 sq ft) for testing.

•Turboshaft. Prop-Corbin-Wright representative L. J. Chaudhry says the Corbin dual-shaft turboshaft propeller on the XTF-1 is equipped with enclosed hollow steel blades and incorporates single-vent folded blades. These, he says, are particularly adaptable to the structural requirements of the high-speed turbojet applications. The advanced propeller is mechanically fixed to the shaft propeller through grooving and is controlled by a single stationary power unit, Chaudhry says.

The complexity and inherent advantages of the electro-mechanical control system offers definite advantages over more conventional propeller control methods and greatly simplifies the control concepts inherent in the turbojet control," he comments.

C. B. Corbin, XPV-1 project engineer, says the VTO fighter has been designed for mass production. There are eight pairs of bolts in each wing and the wings are forgings, he says.

Philippine Leaders Seek More Jets

(McGraw Hill World News)

Manila, P. I.—Jet planes and light aircraft should form the bulk of U.S. military assistance to the Philippines and ground forces should be reduced correspondingly, Senate leaders here believe.

Philippine Senate Majority Leader Cipriano P. Francisco, member of the Foreign Relations and National Security Committee, confirms that such is the joint-service consensus.

•Sensitivity Budget. The Philippines have been demanding a budget of only about \$5 million, with most military expenditures going into the ground forces because of the need for constant external peace and order.

Although almost half has been supplied by the U.S., the budget is too small to take care of maintenance and operations.

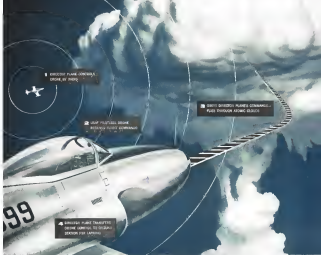
PAT has not yet received any jet fighters or bombers from the U.S.

•Security Force Deletions. Philippine agencies are the positive for a review of the U.S. F-1 aircraft port clearing.

•The three-month action period gives the U.S. an opportunity to look out if the aircraft become obsolete to build.

•Arrived and is intended to avoid equipment and aircraft and is subject to consideration by the U.S. Congress.

•U.S. returns title to the military equipment it is in the Philippines. Also the Philippines control what they call the non-obsolete equipment of military forces retained by the U.S. is the United States.



Pilotless Jets Penetrate Atomic Cloud in Tests

BRING BACK DATA PREVIOUSLY IMPOSSIBLE TO SECURE

THE STORY BEHIND THE STORY

•Miss the drama of atomic tests and nuclear flight and it's gone over now. Such was the case when the U.S. Air Force drove pilotless jet drones into the heart of atomic clouds and landed them safely—with their cargo of more and weapons—for scientific study by the Atomic Energy Commission.

•The story behind the testing of the effect of radiation on animals is that of pilotless flight, "bee" pilots and precise

Sperry controls Lockheed QF-40 drones, specially equipped with Sperry remote flight control systems fly through atomic clouds guided by radio and radar.

•These drones are flown remotely by skilled control pilots who use "bee" lines to command them—either from direction planes in the air or control stations on the ground for take off and landing. Under their radio commands the drone takes off, at the proper speed enters its landing gear climb to the desired altitude, banks and turns and keeps the speed necessary to arrive at

an exact point in the atomic cloud at a prescribed second.

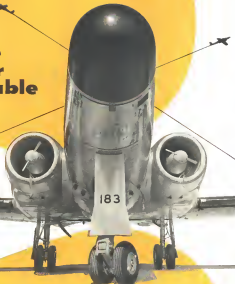
•This remarkable flight control system brings the drone through the atomic turbulence of the atomic cloud under complete control—on course and at altitude. Returning to its control, the radio-controlled drone lands in precision as though a veteran pilot were at its controls.

•Sperry is an old hand at guiding flight. It developed the first guided missile—on aerial torpedo for the Navy—back in 1915. And since 1915, Sperry has been the leader in developing automatic flight controls for piloted flight. Sperry automatic pilots are installed on military and commercial planes the world over.

SPERRY HYDROSCOPE COMPANY

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The big black nose of the CF-100—and what's inside it—is truly a mark of distinction. For it identifies the all-weather interceptor from the day engines and, in the case of the CF-100, as Canada's Aerial Defender against bomber attack across the North.

The "inside", a complex mass of radar and electronic equipment—is designed to guide the CF-100 Mk. 4 unerringly to its target, lock on and destroy it with a formidable armament combination of rockets and guns. The effectiveness of this search

and fire-control system is being demonstrated almost nightly during mock intercepts exercises by R.C.A.F. CF-100 squadrons based at strategic points. With its twin Orendas, also designed and produced by AVRO Canada, the CF-100 Mk. 4 has a greater range and more power than any other fighter-interceptor in service anywhere. The Orenda also powers the Canadian Sabre 3, the outstanding day fighter in service today.

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AERONAUTICAL ENGINEERING



PRE-FORMING: nose tubes in the blade is done in this simple press. Men and most operations are pre-treated with adhesive.



GLUING: interrupted glasscloth tape is incorporated wherever the adhesive requires local application of more adhesive tape.



LOADING: the mold, thin bottomform and top web are positioned before final heat curing of the complete XH-16A blade assembly.



BONDING: stainless steel top to reinforce blade in the next step. Cap causes shoulder loading and drag loads on the joint blade.

AF Gets XH-16A Laminated Metal Blades

By David A. Anderson

Clifton Heights, Pa.—Percott Aircraft Co. is now delivering its first laminated aircraft nose blades to the USAF for control installation on the giant Persico XH-16A helicopter.

The blade structure is completely laminated of stainless steel with aluminum reinforcements, adhesive-bonded in a positive void-free, designed by principal Richard H. Percott for the aircraft blades of the Persico HUP (Aviation Week, May 5, 1972). The basic blade shells, box-shaped frames were built for \$450 per pound, while nose then over half the cost of conventional aircraft structure. Percott believes the cost of the large blade can be comparable.

Looking ahead, that's a possible ap-

plication of the method to the fabrication of control surfaces, tail groups or even complete wing panels. Emphasizing the point, Percott explains that structural planners are worried about the amount of welded metal in the machine approach to aircraft structure. "With this method, you don't make any chips," he says.

■ **Statistics:** The 3-ft-long blade has a 15-in. chord. It is made up of 66 to 70 pieces of 0.005-in.-thick sheet laminated with adhesive in a hot-mold process.

"Weight of each blade is approximately 150 lb., which can be held within plus or minus two pounds. That's a weight control accuracy of about 99.9%, achieved by weighing the sheets before the molding process and

by using sheets alternately from the high end and low end of the acceptable range of thickness tolerances. Final shoulder and sparweb balance is maintained to less than 0.1% difference between blades.

Improvements in the original method have brought the working time per blade down to as low as 55 manhours for the smaller HUP blade. Percott estimates a few months' lead time for quantity production of the big blades, compared to seven months for the HUP blades.

Improvements in the mold and all heat-curing techniques have been made since the company delivered its first HUP blades. In the first case, the laborious hand application of adhesive to portions of the blades has been replaced



Selected for use in our most modern fighter, the F-102—Edison's new fire detection system operates **under the most rigorous performance conditions.** For the research facilities of the world-famous Edison Laboratory—and unqualified experience now provide an aircraft fire detection system that meets **all of the requirements for today's flying.**



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- **Response within seconds** — signals "Fire Det" instantaneously — no secondary response to fire exposure.
- **Exclusive case design** — in three single installation — speed maintenance
- **Warning instruments show points** — from the same detector through wiring a single cable loop — maximum maximum sensitivity for each case installed.
- **Vibration and shock resistant** — increase there are no moving parts — no on ends to break in the noisy forest cells. What's your wire or for engine data on the revolutionary development?

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Models have been improved by Pratt & Whitney for longer than the main use of 16 ft., the models have an improved system of support which prevents any undue alignment of the laminations as erect and shorter jobs.

• **Changes**—These are other specific changes in the mold and in the coating technique.

• **Cycle time** has been reduced to less than two hours, compared with the earlier time of two days.

• **Hydraulic mechanism** for opening and closing the mold replaces the hand operation, accurate in the past.

• **Single silicone rubber** pressure bag replaces the three bags of the earlier mold design.

• **Pratt & Whitney**—These have been the specific accomplishments of the Pratt & Whitney.

• **Model for Per manufacturing**—American Helicopter, Cessna, Kaman and Pacer—have been built with the same set of tools and molds.

• **Five different types of blades** have been built with these tools.

• **These different materials** in different configurations have been used to make blades in these tools.

Pratt & Whitney recently worked on development contracts with the airlines for methods of checking engine blades and for wire-bonded construction. Blades have been designed and constructed using titanium as the laminate other design employ aluminum structure in the leading edge section.

THRUST & DRAG

Cumulative Aerodynamic Laboratory has developed a new windtunnel technique to study what happens when a pilot pulls a turn or a wingtip. The new technique, known as "drag" or "thrust" by GAI's Materials Dept., the tunnel can study the trajectories of aerodynamic under conditions closely approximating those of full-scale flight.

With such tools on hand, models, canopies and sections made out of the way, they suggest that the GAI engineers figure a way to model a missile launching from the ground or an airplane. The industry would be satisfied with either, the way.

Did you notice the types of airplanes in a stock market and company for the first time? Green's conference. In Russia they are known as L-1 transperts, do you see, they're known as Douglas C-47 transports. Whatever happened to the Russian 12 aircraft? The new good enough to sell to the Soviet. As they arrive, aren't they good enough to transport the high performance aircraft—DAA.

Operation Pushover



Deliberate destruction of a full-sized V-2 rocket was the object of Operation Pushover, a preliminary test before Operation Bambi, Navy's drive along of the big missile, from the deck of the heavy cruiser USS Midway. Test was in area possibly damaged in wooden carrier deck and nearby structure in most of aircraft in launching. Bambi, the launching from the Midway, was only partially successful, the missile died at the deck on launch, but broke up at low altitude over the ship. Pushover and Bambi were cooperative projects of Navy, Army Ordnance and General Electric's Project Hiram, completed about 1946, these pictures have just been released.

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Contact Executive Offices, Western Gear Works, 202 Box 182, Lompoc, California.



PRODUCTION BRIEFING

► **Kids Institute for Aptitude Testing, Inc.**, Greiner Bldg., New York 17, has among its 1953 clients the following firms engaged in aviation work: Bendix Aviation Products Division, sales aptitude and aptitude or cognitive testing; Heller Engineering Corp., aptitude or cognitive testing; The Buell Co., sales aptitude testing; Welter Scales & Co., sales aptitude testing; Airborne Instruments Lab., aptitude or cognitive testing; Ford Instrument Corp., division of Sperry Corp., sales aptitude testing.

► **Aerco Chemical Co., Inc.**, Flushing, N. Y., has established a new industrial waste recovery and abatement service based on one of its found for waste from air treatment processes, including both diluents, plastic and rubber scrap and waste products, abrasive dusts, waste transformer oils, etc.

► **C. F. Case & Co.**, manufacturer of multiple contact relays, has moved to a new plant at 3100 W. Pratt Blvd., Chicago 45, Ill.

► **Trempl Corp.**, has moved all office and shipping facilities to 132 W. 23d St., New York, where the company's plant and laboratory are located.

► **Winters Aviation, Inc.**, has been organized and reported headquarters division for the J. K. Goss Co., Inc., at the Ft. Worth-Wichita Falls-West Tulsa area. Main offices for the new firm are at the Seafair Building, 241 North and the City National Bank Building, Wichita Falls.

► **Edward Hale Co.**, West Newton, Mass., is making available a new process for shipbuilding services. Wind Coast carmen are moved through the firm's organization in San Diego, Calif.

► **Boeing Applied Co.** has placed into service an automatic highway construction system looking all day of flow, plans and engineering operations. The system, installed by Western Union, permits one station in the network to originate a message to any other station without previous calling in connecting. Messages are recorded at the destination in exact form of transmission. The company also plans to put up two buildings, each more than 500,000 sq ft of floor space; the other will be a 450,000 sq ft addition to its present plant center.

After
a
5g
Turn



IS THE DATA VALID?

The moment an oscillograph is taken out of the laboratory for aircraft flight testing, vehicle road tests, or any application where vibration and dynamic g forces are present, the "balance" of its galvanometers—the measure of their response to gravitational forces—becomes all-important. An unbalanced galvanometer can cause deflection—under only moderate g loadings—large enough to distort a data trace and make accurate record interpretation impossible. It can show deflections even when no data signal is present.



Miller Instruments' improved galvanometers are supplied of no extra cost with balance so closely controlled that trace deflection is within 0.010" per g in elements of less than 300 cps natural frequency and within 0.001" per g for higher frequencies. The unique open construction allows balancing to be the final operation before shipment. No subsequent assembly steps disturb the balance achieved. Trace deflection due to g forces displacing the suspension is negligible.

Sound basic concept and extreme care in manufacturing and testing make Miller Galvanometers unequalled not only in their balance but also in their control of sensitivity, linearity and stability. Inaccuracies have been literally "designed out." The unusual fineness of the traces they produce have long been the standard in oscillographic recording. Available with natural frequencies from 35 to 3200 cps and a wide range of sensitivities, Miller Galvanometers are described in detailed literature, which will be sent on request.



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FINANCIAL AID TO HIGHER EDUCATION

What Business Can Do to Help Our Colleges and Universities

In the financial squeeze now gripping our colleges and universities grave enough to warrant direct action by the business community? If so, what can business do about it? This editorial is addressed to these two questions.

In the previous editorial in this series of two, it was demonstrated that our colleges and universities, and particularly the independent institutions, face financial difficulties, which, unless relieved, promise to get progressively worse and might ultimately result in a national disaster. This state of affairs obviously gives the business community a crucial stake in helping to relieve the plight of these institutions. For our business organizations can be no stronger than the total community of which they are a part.

It does not follow automatically, however, that every business firm should give direct financial aid to education. Already the business structure is heavily laden with activities unrelated to its main purpose. These include acting as tax collector for more than \$65 billion of federal, state and local taxes in the year 1953. There is a limit to the amount of such public enterprise that can be loaded on the business system.

Business Holds Key to Answer

If, however, the survival of a key part of our educational system depends on its having financial help from the business community, that help should be provided. And this is the situation of our indepen-

dently endowed colleges and universities.

Of course, our tax-supported institutions of higher learning must also be kept strong, financially and otherwise. But they have recourse to public support not available to the independent institutions. Largely on this account, their present financial difficulties are much less acute than those of the independent colleges and universities.

These independent institutions have seen price inflation eat away much of the value of their endowments. Moreover, there is no prospect that these endowments can be sufficiently replenished by gifts from the wealthy people who provided them in earlier years. Progressive income and estate taxes have seen to that. Thus, they are faced not only with a peculiarly acute financial problem, but also one which cannot be solved except by tapping other sources of aid.

Tax Support No Solution

It is conceivable that the independent colleges and universities might solve their financial problem by seeking support from tax revenues. If they did this, however, they would lose their distinctive character as independent institutions, and our system of higher education would lose one of its major elements of strength. That is the outcome in our educational system of both independently financed and tax-supported colleges and universities. Each has its special contribution to make to a well-balanced system of higher education.

Business is directly dependent upon higher education to staff its increasingly complex and exacting operations. A key part in this process is played by the small, independent liberal arts colleges which are the hardest hit financially of all our institutions of higher learning. "These," states the Council for Financial Aid to Education, recently formed by a group of business leaders, "have contributed a high proportion of the intellectual, scientific and religious, as well as business leadership of the nation. Their programs are devoted to the teaching of values, particularly the values of freedom. They are a vital linkback to our system of free enterprise."

Means of Providing Help

There are many means by which business firms can extend help to our colleges and universities. The most obvious, of course, is to make outright grants of money either to individual institutions or to groups of institutions for such uses as the institutions think best. Another means of help, increasingly employed by business firms, is to establish scholarships to pay the full cost of college or university courses of study. Sometimes the scholarships are open for general competition, sometimes they are limited to employees and children of employees of the firm granting them. Not infrequently those winning the scholarships spend some part of their school vacations working at the companies granting the scholarships.

A number of companies have recently provided for what have come to be called "scholarships in revenue." These companies pay a flat sum to a college or university for every one of its graduates they employ. Extending of university research programs also offers a broad avenue for financial aid to our universities by business.

Need Two-Way Communication

Some business firms have well-developed programs for financial aid to education. But they are exceptional. For most companies the problems involved are new and strange. These companies were created with the basic purpose to make money, not to give it away. Successful philanthropic operations involve a whole set of

problems with which they have very little experience. Not the least of these is how to make business a dependable source of financial aid to education, since business has no assurance that the profits of one year will not be lessened the next.

Considerations such as these emphasize the wisdom of a recent Industry-College Conference as to higher education by business, in making the first of its ten conclusions that "better communication, by direct contact, is needed for each [industry and the colleges] to understand the problems of the other." At this juncture the mention of mutual understanding is much more important than the raising of some money and letting it go at that. The problem of aid to education by business has its immediate urgency, but there is also a long-range program to be developed, as which business and the colleges and universities must pool together in the years ahead to find a satisfactory solution.

As stated at the outset, failure to find a satisfactory solution could result in a national disaster. This means that, to give proper heed to their own future prosperity and the future welfare of the nation, business firms generally must go to work on the problem of financial aid to higher education. They must go to work first, to understand the problem; second, to establish two-way communication with our colleges and universities about it; and third, to develop a program which pays proper heed to the needs and capabilities of both business and higher education.

This message is one of a series prepared by the McGraw-Hill Department of Research to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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S.O. 1221's internal rotor-pumpjet system is shown in the schematic of the rotor.

Sneaco Testing Production Djinn

The production version of the S.O. 1221 Djinn, a lightweight gyroscopically balanced, capable of carrying nearly its own weight in useful load, is being tested by the French navalized aircraft firm Sneco, Paris. The engine development program extending back to 1946.

According to Paul Marcon, Sneco's chief of helicopter development, the Djinn's post-pilot system can serve as the basis for larger engines rating 20 or 40 horsepower.

Power System—Heart of the Djinn two-phase is the turboelectric combustion wing in a power source a Turbo motor Pileurite air generator. The Pileurite is a simple unit in essence, the power assembly delivered to a shaft is entirely used by the components. The compressor has been over-designed so that the excess of air it produces can be used in the rotor.

Extraordinary difference between the Djinn and the earlier Aéro series of jet engines linked by Sneco is that the latter had blade by combustion chamber where fuel was injected and ignited, whereas the Djinn relies solely upon the compressed air generated by the turboelectric Pileurite unit to spin its own two-blade rotor.

Marcon admits that the former system provided more power from a smaller pump engine, but acknowledges the present design gains in simplicity, torque reduction and reduction of fuel consumption partly outweigh those of the previous method.

Rotor Mounting—The rotor's hub is a free-oscillating type. The hub and blades from a unit which tilts around up to cyclic pitch commands transmitted from cockpit controls. Marcon points out that in this vertical relative

movement of the blades in vertical flapping is ordered to a minimum and that it can track for free movement of the blades in the plane of the rotor. The method also eliminates drag dampers, which he notes are difficult to regulate.

Cyclic pitch control, like the collective pitch control, is of the pulley type, with a rod going through the axial bearing. Concentrically around this bearing, two spherical elements rotating with the mobile portion of the hub, track off a space through which the compressed air from the Pileurite passes into the rotor. The air reaches the blades through a glass cloth hose, sheathed with asbestos rubber, which checks the relative movements of the blades in relation to the hub.

Blades are attached to the hub by tensile steel straps directly linking the blade root to the opposite one. In this way interdigital action is directly balanced and supported entirely by the metal straps, their flexibility allowing for pitch variations and vertical flapping. The method eliminates all bearings and straps normally used to hold the blades and reduce maintenance.

Blade Makeup—Blades are aluminum, with a hollow spar housing the leading edge. The Copter company extrudes this spar with a variable thickness. Following extrusion, the thickened section of the blade near the hub is cast into a circular section to permit reinforcing of two cylindrical bearing surfaces and an axle on which to which is bolted the new fittings for the tensile steel straps.

The leading edges are made up of light plates made rigid by using a carbon material bonded to the sides by an outgassing process to the spar

by two joints with sliding in slots at the outgassing and spar. The joints are fixed to the hub by a fastening device which takes the centrifugal loads.

The blade is connected to the hub by a pipe which serves as a duct for the compressed air and also has a vented element fitted in it that ensures pitch positioning of the blade in the rotor. The jet carries at the blade tips are fixed secured.

Hub rotating only are lubricated by circulating oil. A rubber bellows isolates the hub weight and protects it from dust, while allowing it to tilt.

Performance—The new Djinn weighs 675 to 760 lb. empty, depending upon equipment (which may include a wind shield equipment or enclosed cabin, electric self-starting instead of crank start), dual-mounted wheels and other items.

Normal gross weight is 1,800 lb. At this weight, the company states the S.O. 1221 can take off vertically from airfields at elevations up to 6,500 ft. Optimum cruise speed is 61 mph with cruise fuel consumption being 225 lb./hr. The engine's normal torque is 65 ft.-lb. Highest efficiency is gotten from track position at 4,000 ft.

With an average pilot and without fuel or payload the Djinn weighs 905 lb.

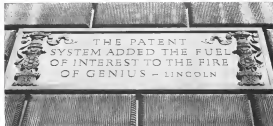
Djinn Genesis—Immediately following the liberation of France after World War II, some Sneco engineers perceived principles of a cyclic wing component as used in combination elsewhere in the world type. They later learned that in America, Germany, Döhlhoff, had already developed this principle and flown an experimental type.

The Döhlhoff team was disbanded, some of the experts going to work with the Royal Air Force in Britain where they worked on development of the jet-powered Gyrodyne (Aviation Week Apr. 18 p. 49). Döhlhoff went to U.S. where he too worked on McDonnell's Little Henry engine rotor and is now engaged on the XV-3 convertiplane. Other engineers from the group joined Sneco and settled in its jet experiments.

Background—The group that came to Sneco developed jet engines along the following configurations:

- **Model 1**, which flew first in April 1946, powered by a piston engine which had compression adjusted to combustion chamber at the tips of the three-blade rotor. This model lacked power.
- **Model 2**, modification of the Model 1, was fitted with a new engine driving a new compression-adjustable Turbocharger. But owing a piston engine which the aircraft was extremely poorly fitted.
- **Model 3** was the next step. It had a Turbocharger Avco-Lyons turbine driving a centrifugal compressor on the

DO YOU BELIEVE IN THIS?



DESCRIPTION: U.S. DEPARTMENT OF COMMERCE, WASHINGTON, D.C.

For men have left this Nation a greater legacy than Abraham Lincoln. For his was the genius of seeing truth where it was hard to see.

He knew, for instance, that men work best when given an incentive. And that, like other men, the scientists and inventors who shape our future must have an incentive. He summed up this vital truth in the few simple words which you see above.

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some transmission shift, and in the same year the Anet 5 first flew in April 1933. However, this model proved to be very noisy, Mexican noise, and the company went on to eliminate the rotating combustion chambers. Rag described, in this glass was that it yielded a 30% reduction in power available for the motor, making it necessary to double the powerplant in the fuselage to maintain the same performance. About this time Tuberosa brought out its 240-hp. turbocharged 16-cylinder.

•Dodge S. O. 1120 incorporated the new Folsom and a system of deviating turbine exhaust flow by means of a radiator to pre-determined angles even while burning. Power collected by the radiator is about half that which would be obtained using the same turbine and blade-tip combustion chambers. But since with rotation of the duct type about as much fuel is consumed in the combustion chamber as in the turbine, fuel consumption ratio is about the same.

The elimination of blade tip combustion chambers and fuel and ignition systems and price of this power is far from further advantage. Power in the fuselage must be doubled, but the weight and price of this power is far from being doubled. Mexican states initial flight of the first Dodge was made Jan. 2, 1933. Two S. O. 1120 prototypes made successful demonstrations before engine and military groups. The results of these tests were so satisfactory that Dodge went onto its current model the S. O. 1223.

AF Tests 'Ice Boxes' To Keep Food Warm

Dupont-Via Force engineers at Air Materiel Command are working on "ice boxes" with a reverse twist. Supply officers here at Wright-Patterson AFB are looking for a big "thermos jar" in which fresh meats, eggs, vegetables and other food can be preserved to inland bases and observation posts made the foggy Arctic circle.

There is no problem in keeping things cold at these posts, where the temperatures go down around 60 degrees below zero. The problem is to keep our dropped supplies from freezing solid by the time they hit the ground.

Col. R. L. Minton, packaging specialist at AMC, recently took a team of civilian suppliers on an Arctic ice tour to look at the problem firsthand. Four days later, one of them furnished AMC with a frozen glass "ice box." It is now being tested out in the Arctic. If successful, it will be super-packed for fresh food delivery to Alaska, Navy and USAF outposts.



on the wing tank studs of the DC-7



-assure precision fastening to the exact foot-pound

It's America's fastest, most luxurious airline—the new Douglas DC-7! On many critical assembly operations in the construction of this great airliner, perfect bolt tightening is assured through the use of Snap-on Torqometers. Torqometers offer accurate advantages that have won them wide preference throughout the aviation industry. For lifetime accuracy, readings on the big dial are supplied nearly 900 times. Readings are almost dependable. Torqometer design eliminates friction drag. Accuracy is never affected by the way the wrench is held.

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G-E JET ENGINES installed in B-47 develop much greater thrust during takeoff because of water/alcohol injection. A 400-gal tank at rear automatically begins operation and sustains engine temperature.

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Fuel is sprayed into exhaust gases in afterburner to give extra thrust when needed.

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SOUPED-UP JET ENGINES... have they reached maximum power?

Not according to G-E engineers, who are working on simpler ways to achieve better, more efficient thrust augmentation

Your G-E-powered aircraft can take off from shorter runways and climb higher, faster . . . all because of improved thrust augmentation methods developed at General Electric over the past 11 years.

Yet jet thrust augmentation—as a precise science—is still in its infancy. That's why General Electric engineers continue their search for ways to get simpler, more effective power when needed.

Electric progress has been made at G-E since 1948. Company engineers perfected an afterburner for use on the North American Aviation F-86D Sabre Jet. A G-E water/alcohol injection system

has been developed to provide added take-off thrust for Boeing B-47 Strategist.

New G-E augmentation systems (now under security restrictions) are available to the U.S. Air Force and Navy. By continuing to develop, analyze, and apply engine combustion data, G-E engineers are rapidly developing even newer methods.

Our jet representatives will be glad to discuss with you what General Electric is now doing in the thrust augmentation field. Contact your nearest G-E Apparatus Sales Office, Section 238-24, General Electric Company, Schenectady 5, N. Y.

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AVIONICS

Panel Offers Ideas for Avionic Problems

Dayton forms suggests ideas for better reliability but finds no answer for growing complexity of devices.

By Philip Klein

Dayton, Ohio—A panel of 11 avionic experts believe reliability, not complexity, is the greatest problem in building practical, maintainable and technically effective military electronic equipment (see p. 26).

These representatives of the avionic industry, aircraft builders and military users were participated in a forum during the recent Dayton conference on electronic electronics—offer many ideas on how to improve reliability than on how to limit complexity.

"What is considered complex today may be considered the source of complexity tomorrow," says panel moderator Dr. W. R. G. Baker, vice president of General Electric's Electronics Division. "Complexity, therefore, is relative to time, the technology of the user, and in inverse proportion to its reliability."

► **Performance Needs**—Comments by other panel members on the availability of complexity.

► **Complexity results from the need for performance**—Some jobs we are trying to do are not on the verge of possibility," according to Dr. G. S. Draper, Massachusetts Institute of Technology.

► **The amount of complexity is dictated by the technical problems to be solved**, says E. K. Fetter, general manager of Bendix Radio.

► **You cannot legislate out complexity by dictata**. It is a result of outside forces," John Kato, technical director at Wright Air Development Center, Dayton.

► **MEM Dissect**—Several panel members, representing equipment users, stated solid engineering rules by exposing constant vigilance against growing complexity.

► **A thorough study of mission requirements can sometimes reduce complexity**—by complete elimination of some defense goals," suggests Henry Rempel, electronics and instrument chief engineer at Lockheed Aircraft Corp.

Rempel adds this note of caution: "The study should be made in the shortest possible time."

While you are working on the job of a device, someone else will add three new systems."

► **We need more feedback of information from equipment designers to**

military services to tell us when the point of diminishing returns is reached in terms of complexity," says Maj. Gen. Gordon A. Blake, USAF Chief Communications Officer.

► **Evaluating Complexity**—Not only is complexity a relative matter, but it is a difficult thing to evaluate. Dr. Baker points out. In business, equipment and its complexity can be evaluated economically in terms of cost versus return.

However, in military service, return is measured not in dollars but in terms of tactical advantage, lives saved, sometimes in morale, soldier says. Cost involves not only money but time of development, time of maintenance and in reliability.

► **No Guesswork**—On the subject of reliability, Dr. Draper holds out hope for a causal relation. "Reliability is a matter of a matter of guesswork, it involves lots of preparation and hard work on many individual improvements," he says.

Here are some suggestions by panel members:

► **More Development Time**—"One reason that equipment innovation is much trouble in the field is that it has not undergone sufficient development before being put into production," Draper says.

In reply, Maj. Gen. Clarence S. Brown, deputy commander of the Air Materiel Command, points out that the Russians are the ones who set our military requirements and timetables.

► **Data For Designers**—"Industry must expend more effort in engineering [air] designs with the addition of [field] service conditions," says Arthur Van Dyck, staff assistant to the technical director of Radio Corporation of America.

► **WADC's Kato calls for better application engineering data on components to guide military designers**. He cites the recent report by Aeronautical Radio, Inc., on tube reliability (Aviation Week Apr. 5, p. 12, Apr. 16, p. 8) as an excellent example of what is needed.

► **Fewer New Designs**. Van Dyck urges the Armed Forces to put more emphasis on continuous production of existing equipment, not doing its number of new designs. Production should be scheduled for continuous flow to enable manufacturer to establish his



Paul Anderson W. R. G. Baker (left) shows to Kato getting first-hand report on avionic problems from Gen. Van Dyck.

process, debug his manufacturing techniques and equipment design.

If you have only one design, you will have "bugs" all the time," Van Dyck warns.

► **Dollar Reliability Needs**. Reliability of equipment starts with the initial design, says Fred Henderson of Western Electric, who urges the military to spell out specifically what they need in reliability—how many hours of continuous operation with what degree of continuity.

► **Feedback, Overhaul, Modification**. Henderson also urges that equipment be pulled out at regular intervals, like annual repairs, and returned to the original manufacturer for overhaul and modification to incorporate latest design changes.

A similar recommendation comes from Dr. Draper, who calls for modification criteria where equipment could be returned to have its performance improved, much as it does with aircraft.

► **More Reliable Components**. Several speakers call for increased development of more reliable components, while acknowledging that considerable progress has been made in recent years.

Dr. Baker suggests "It may be that some major breakthrough in the field of new materials will permit a major improvement in [component] reliability." And there is much evidence that we are getting many sources of new component technology.

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Swivel tail pod treatment installations are slated for other new bombers.



225-2300 signs which equipment comes from in B-47 are installed in tail.



B-47's TAIL SPYGLASS, GE developed automatic radar-directed fire control system, a first to be made in a detachable pod.



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AVIATION WEEK, June 21, 1954

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►SE Transistors Available—High frequency passive transistors made by the new Philips surface-laser technique (ANALOGUE WORK Jan. 4, p. 50), are now available in pilot quantities for use in government-sponsored non-

tracts. Inquiries may be addressed to Charles Ford, Platts Corp., Government & Industrial Div., 4780 Wrentham Ave., Pittsburgh, Pa., and should include government contract number.

***CAL Studies Weapon Systems**—Curtis Aeronautical Lab is completing evaluation studies on search, fire-control and ordnance equipment of new weapon systems for tactical aircraft. CAL is also investigating automatically controlled carrier approaches for jet aircraft and the use of artificial stability devices (dampers) for improving helicopter flight characteristics.

► **Swiss Buy Bender GCA**—The Swiss military establishment's technical department has purchased three Bender Radar mobile GCAs at a cost of \$1.5 million, the company reports.

• **F-100, F-101 Simulators**—Flight simulators for the North American F-100 and the McDonnell F-101 are under development at the Melroe Div. of Westinghouse Air Brake Co.

• **New UHF Power Triode**—New lightweight (5 oz.) power triode, the 6555, designed for submicron communications at frequencies up to 2,000 mc, has been announced by RCA's Tube Division. New tube has a maximum plate dissipation of 500 watts, maximum I_p is 2.5 a 41 in., requires liquid cooling.

■ **New Market Beacon Receiver**—New miniaturized radar beacon receiver, the ARN-32, developed by Calsity for USAF, is reportedly only one-third as heavy and as large as its ARN-12 predecessor, and only one-third as much power. —EP

479



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Research and test facilities at Nasa's Goddard Space Flight Center include a 20,000-sq-ft, 10-ft-dia. vacuum chamber for testing spacecraft components. The chamber is used to simulate the extreme temperatures and pressures of space. It is also used to test the performance of various materials and components under simulated space conditions.

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NEW DEPARTURE

HOT TOPICS • **RECENTLY RELEASED** • **UPCOMING**

Pumps Keep Abreast of New Jet Needs

• Penco engineers design fuel systems and hydraulic devices to meet demands of turbine powerplants.

By George L. Chastain

Bedford, Ohio—Penco Products Co.'s pump engineers have been busily engaged in keeping stride with the need for more efficient fuel systems in the jet age, increasing quantities of fuel to supply jet powerplants and accessories.

At the same time they are engaged in a major development effort to design aircraft hydraulic pumps to withstand higher speeds, temperatures, pressures and new type, of high-temperature hydraulic fluids.

■ **Single Package**—One notable trend evident here is the tendency toward including all jet engine and accessories fuel pumps in a single unit. Example is Penco's Model 021717-011 pump, which is actually three pumps in one. Fuel goes first to a centrifugal booster pump which leads two jet-type pumps in parallel. One supplies the engine, the other the accessories. And Penco is already experimenting with a four element pump—one centrifugal and three jet type.

J. A. Gerington, Penco's assistant chief engineering, points out this patented feature of the Penco multiple jet-type pumps.

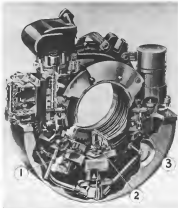
Conical construction of the shaft-to-gear element accommodates the shaft motion on the gear instead of on the shaft. This means that in case one of the pump fails in a way, the other continues to turn, supplying sufficient head to allow the engine to develop full takeoff power at all levels.

■ **Single Package Advantages**—There are several advantages to supplying all fuel pumps in one package, according to Gerington. Among them are:

• Elimination of extra plumbing that is required in the case of multiple pumping units. This in turn means space saving, easier plumbing, greater reliability and the need of but a single engine diverter fuel all pumping requirements, which is important as a jet engine where dropouts are serious.

■ **Single shaft** and because of series construction means but one viable source of failure in case of failure.

Complex yes, but it's small, but important point. He adds that should



OUTWARD of a poppet integral oil system reveals three Penco cascade pump-

ing the fuel fed, there would be no appreciable effect on the pump's operation.

To accomplish fuel system requirements as in earlier, Penco has incorporated integral, bar-type fuel filter in the pump package. And the company is now building pumps with pads to accommodate the fuel control so that it too may become part of the package.

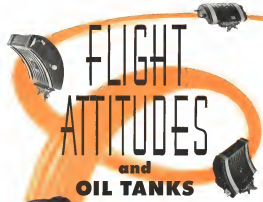
■ **Must Tie-into**—An important trend that Penco engineers see in fuel system design is the move toward construction of emergency fuel pumps. They say this is possible because the basic reliability of the pressure-loaded gear pump design "is so high as to warrant such action without incurring undue risk." The company says that there is a place flying today without any emergency fuel pump, and that weight and one of the best pumping unit has

been cut 40% by this innovation.

Penco notes that other important trends are the development of higher pressure pumps for use, higher pressure engines, and use of increased rotational speeds to keep pump weight and size down as much as possible. However, higher speeds multiply and compound problems in pump design and manufacture, the company points out.




■ **On Every Jet**—Penco has supplied fuel pumps for every jet engine ever flown in operation in that country, from the venerable General Electric J4 which powered the first U.S. jet aircraft—the Bell X-1 to the latest.

Currently, the current production pump is the Model 021264-021, designed for the Wright J67 engine, a 7,200 lb.-class turbojet engine. Unit consists of dual jet pumps in parallel, (Continued on page 65)




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(Continued from page 64)

lefts fed by a centrifugal booster. Pump delivers 40 gpm. at 500 psi, at 3,000 rpm and weighs 23.5 lb. Size is approximately 11 1/2 in. x 11 1/2 in. x 11 1/2 in.

Largest pump in production is the Model 022717-111. This too is a centrifugal booster-fed, diesel gear-type pump. This unit delivers fuel at 750 psi. It furnishes a total of 115 gpm., approximately 40 gpm. to the engine and 75 gpm. to the accessories. Pump weighs 35 lb. and measures 17 1/2 in. x 11 1/2 in. x 11 1/2 in. It is used as Pratt & Whitney Aircraft's P37 which powers such new planes as the P4D, F-100 and F-102.

Because of the trend towards higher pressures, Peco has in full production a single-gear fuel pump which operates at 1,000 psi. Eventually, the company is looking at and to the 1,500-psi class.

To keep up with an increasing fuel consumption, Peco has in development a dual pump which will deliver up to 200 gpm. for engine and accessories.

Peco officials say that their Model 27179F has been probably the standard fuel pump for jet engines today. Over 30,000 have been built and are used in still in production for the GE J47. A majority of the 27179F pumps produced went on to J47-equipped B-47s, says Peco. Each quantity equipped J47s and early J15s.

The company sees no trend towards simplification of fuel pumping equipment, on the contrary, it feels a trend towards specialization instead.

- **Hydraulic Charge-E** A. Schenck, Peco's assistant chief engineering division, told Aviation Week that his department is concerned with problems similar to those being faced by the fuel group. Higher pressures and speeds are required in hydraulic pumps as well as higher operating temperatures.
- **Pressure** is in production on 3,000-psi hydraulic pumps and is experimenting with units up to 5,000 psi in speed (the which the gear-type pump is ideally suited), says Schenck. Production pumps face up to as high as 6,000-8,000 psi, while models in limited production have reached 12,000 psi. Five at speeds as high as 12,000 rpm, Peco gear-type pumps can operate with as little as 25 psi inlet pressure because inlet porting losses are very small, Schenck says.
- **Emergency Turbine**—Due applications for which these high-speed pumps are being used is as an emergency, high-speed, remote turbine-driven hydraulic pump to supply hydraulic pressure at the plane's main engine becomes inoperative. To operate, run an turbine and hydraulic pump are extended into the streamlines which back the turbine at high speed.



Peco 022564 dual fuel pump is used on Wright J47 Supersonic turbojet engine.



CARBIDE PUMP is a sample of the used in Standard Standard prop jet system.



HYDRAULIC PUMP drives engine of from auto to aircraft turbo in Super Coax.

The gear pump is suitable for this use because, being able to turn fast, it can be located on the turbine drive with a 1 1/2 in. diameters weight and components of reduction gearing. As for the pump itself, they are relatively small and light.

- **Cartridge Pumps**—A specialty item among pumps is the Peco cartridge unit. Schenck defines a cartridge pump as one which "is inserted internally in another assembly and becomes integral with that assembly. It is usually designed without seals and internal fluid connections." He further a trend toward increased utilization of this type of pump in recent.
- **Currently**, a primary application of cartridge pumps is in the "independent of system" made by Standard Standard and which hydraulically controlled pistons on each aircraft as the Boeing C-97, F4U, C-119 and C-123. In these systems, which use MIL-015066 oil, cartridge pumps are used

as the main propeller governing pump, scavenger pump and auxiliary, electric motor-driven propeller feathering pump.

As the name implies, the independent oil system controls these pumps, separate oil systems, independent of the engine's oil which is used to control propeller. Made up of an oil control line, Standard and auxiliary.

Peco says that Aerobators have long used cartridge pumps for the same general purposes in their propeller oil control system.

Another, all-weather, constant made by Peco is a motor driven by a hydraulic pump. This is used on some Lockheed Super Constellation to transfer engine oil from fuselage to main oil tank in engine oil tanks at the latter become depleted.

In the piston plane field, Peco has electrically driven hydraulic pumps installed on the General Vought Republic guided missiles. They, along with the Mustang missiles, also used.

Peco engine fuel and fuel booster pumps, according to the company.

- **A.C. Pump Drive—**Blue Bolt, Peco's general sales manager, told Aviation Week that Peco is presently in research to develop a small, efficient, constant electric motor drive for pumps.
- **The type of drive is particularly useful for advanced booster pump installations, because motor is a.c. and has no brushes and contact arc, fuel may leaky under. That eliminates troublesome work between pump and motor.**
- **Advantages of the three-phase, 440 cycle a.c. electric motor-driven pump are weight and space savings due to light construction and small size of the motor. Elimination of brushes and commutators helps to prolong service life and replace hydraulic pumps more of the motor whose bearings are lubricated by the fuel in the motor.**
- **Meridional Lab—**He made sure that he took account of what it is supposed to be. Peco says a couple of such pairs at least in the existing department.
- **The samples are sent to a fully equipped metallurgical laboratory where they are checked for many other things: hardness, chemical analysis and structure.**
- **The lab also is responsible for chemical analysis, chromatography, heat shock, control, working control, rubber and plastic control, control of heat treating procedures, including oiling, magnesium and Ziegler properties, administration, and materials review.**
- **Woods Plant—**an plant, under the name of many companies, added factory, was opened in Woods, Ohio in December 1952. "This new unit will serve as an additional manufacturing facility for Peco pumps. The plant, all of

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Power Factor	0.95
Efficiency	95%
THD	5%
THD	5%

WEIGHT Approximately 10 pounds
MAXIMUM OPERATING TEMPERATURE -55 to +125 F (-70 to +50 C)

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OUTPUT	AMPERE
50 Hz	30
400 Hz	100
50 Hz	30
400 Hz	100

Manufacturers of Bendix Red Bank VACOS, Inc.,
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PHOTO AIR PUMP, used on F4U's, F5F's, F8F's, etc., for high altitude flying, low altitude flying, low altitude flying, low altitude flying.

When production is for the aviation industry, the photo pump is used for the production of high altitude flying, low altitude flying, low altitude flying, low altitude flying.

Wendler is an almost completely self-sufficient unit, according to Ed Wendler, the representative's vice president. Only outside purchases are rubber materials, castings and standard hardware. This plant has developed its own means of supply, including completely different from the standard flying. The Wendler division.

The division has a total space area of 104,800 sq. ft. compared to Peco's total 208,000.

Air Force Getting Flying Photo Labs

Dayton-Six last "Aviation" photo pump. Wendler's division by the way, is an Air National Guard unit in cooperation with private manufacturers are now in production for the Air Force.

Designed for transport inside the F4U's C-119 Packet to advance bases throughout the world, the lab is self-contained in standard, highway type truck trailers, each can print 10,000 photos a day and is ready to operate in less than two hours after being loaded.

The air-transportable unit weighs 15,000 lb each, completely equipped. The cost about \$40,000, of which \$15,000 is the price of the 7,800 lb aluminum trailer.

The laboratories are built in six basic units, with 11 variations for the particular needs of photo reconnaissance equipment. The basic type include units for color processing, infrared film, and maintenance and repair of camera equipment.

These design problems of the flying lab was to contain all needed equipment in a mobile "house" which could be accommodated by the recently C-119 without disturbing its center of gravity. Bendix is a completely self-contained workshop in which even the



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reverted into a high bypass design on the hot end as well and power, increasing by 33%. This saving plus improved propeller efficiency resulting from reduced diameter, can result in a nearly saving of approximately \$2,000 a year according to the airline.

Based on head-on tests of two TCF engines at the 7,000-hr overhaul period, Lisle-Gentel concluded "... The use of TCF as a final addition, comes up perceptible change to the part of the engine."

The owner says that "as a result of these tests, it now intends to include TCF on all the fleet used by its airline."

OFF THE LINE

New Montreal B-4 computer, is both lightweight and standard version, is now available in Canada through newly established Office Trading Co. The computer, made in Montreal, is used by many airlines and the military and is being tried by the Royal Canadian Air Force, according to Col. J. Adhem. 4790 Plummer Ave., Apartment 13, Montreal, Canada.

Shell Oil Co. has developed a pumping system for aircraft refueling trucks that now pump up to 100 gpm. The system features a jet ejector in motorized pump employing the Venturi principle. The speeds up fuel flow and permits use of lightweight, collapsible hose instead of the heavy, rigid hose now in common use. Shell is planning to make the system available without cost to the oil and aviation industries. The company estimates that adaptation of the jet ejector to fuel pumping systems will save approximately \$1,000 per refueling unit.

Midwest Airlines has awarded Delta Aerospace, Inc. a contract to overhaul the R1300 engine which powers the carrier's Sikorsky S-55 helicopters. The Dallas contract, for last an overhaul contract with Midwest for five years to overhaul the airline's DC-3 R1300 powerplants.

Argonath, Inc., has moved its Civil Aeronautics Administration Report Agency #1596 to larger quarters at 666 Rockwood (Turnpike, Lawrence, E. I., N. Y., adjacent to New York International Airport. Company has new Green Hydrogen equipment to test retractable pitch propellers, Woodhead and Polys-type electric heads and test stands to handle variable displacement hydraulic pumps. The firm also is now a member overhaul agent for Bendix, Stromberg, Eclipse and Thompson.

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Cabin supercharger drives on the new Douglas DC-7 use the largest known variable delivery aircraft hydraulic pump — the new Vickers PV-3918. Like the DC-7, the PV-3918 is an outgrowth of previous successful designs.

This pump is a development from similar but smaller pumps used in the DC-6, DC-6A and DC-6B. The basic application was so successful it was adopted for the new DC-7. The new pump provides a 147% increase in flow capacity with only a 30% increase in weight. A special feature of the PV-3918 is an overspeed control which automatically limits the maximum pump delivery.

and accordingly provides weather safety check on compressor impeller speed.

For further information about the numerous advantages of Vickers Variable Displacement Piston Type Pumps, ask for Bulletin A-5203.

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colours is offered for different request results. With the smallest number, grey is first in 003 as can be seen, 5 5 White notes.

Chief advantage claimed is that cut bag action is accomplished without need for rise in temperature. Also, surface irregularities in material being welded do not affect accuracy of the cut, says the company.

Unit is electrically controlled, operating on 110v, 60-cycle ac current. Propellant gas can be any dry, inert, cylinder type.

For most cutting operations, a water-soluble aluminum oxide powder is used, but company also offers a lighter mixture of magnesium and calcium carbonate.

3-8 White Industrial Division, 20
East 40th St., New York 16

Production of sand roosts for ostriches is speeded by use of a new high-impact thermosetting plastic. The plastic is used for making sand-roost discs.

After the hot-dip has been cut or machined from metal, duplicates are quickly and accurately made from the new plastic in an inexpensive, low-pressure press. One user reports that the plastic dyes retained their original shape and dimensions after more than five hundred 45-min. cycles at 450°C.

The plants, known as Fiberts 4030, foam easily at low temperatures and low pressures, says the manufacturer. Solid sand cores are removed from the drums with no difficulty. In the foam ing stage, Fiberts 4030 foams at 720F at 300 psi. Aging and heatsetting of dry cast requires a 6 hr. anneal at 100F.

Fiberts Corp., Wisconsin, Men-



POST4246 welder does big job

A portable arc welder which weighs only 65 lb. considerably does the work.

AVIATION WEEK, June 21, 1954



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To find a target or become survivors takes accurate, radar-assisted navigation. The reflections that send and receive radar's telltale impulses perform a vital function. Parabolic shapes must conform exactly to DESIGN. Top flight electronics manufacturers know that parabolic facilities and techniques are unmatched in critical stainless steel and aluminum fabrication. For this sort of experience in this field has earned for Lovell the reputation of a particularly well qualified and reliable subcontractor.



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of a conventional welder four or five times as fast. It operates on either 110 or 220 v. ac, 50 cycles, with a rated output of 250 amp. It actually delivers 250 amp.

The "Run/Weld" welder incorporates a new "ultra high efficiency" transformer, according to the manufacturer.

It heats, cuts, preheats and welds steel, up to and including 14 in. thick. There are no moving parts requiring adjustment.

Unit handles electrode from 5/64 in. up to and including 5/16 in., using either sticklike or carbon arc process. Housed in a cast aluminum case, dimensions of the unit are approximately 11 1/2 x 7 1/2 in.

It comes complete with 7 1/2 ft. of working cables, electrode holder and ground clamp.

Welder is available from Kenaco Div. & Motor Corp., 1314 Northern Blvd., Long Island City, N.Y.

ALSO ON THE MARKET

Test probes, available in a lot of six, amplify voltage measurements across pins or contacts of AN connectors and prevent damage to the connector. Type 510 kit includes three male and three female probes for Sizes 5, 12, and 16 pins and includes—(a) D-Tronics, P.O. Box 15, Lancaster, Calif.

Subminiature O rings and other non-scope parts are produced through extrusion of the injection molding process in sizes as small as .010 in. cross-section and 620 or more diameter—Miner and Reicher and Gaskit Co., 3519 Woodside Ave., Minneapolis 16.

Trojan screwdriver which may be set between 6 and 6 1/2 in. holds no current, neither A or C. Designed Model 5105 Trojans, and has gripped feature which permits torque



beyond the point point from being transmitted to the screwdriver blade—Archie Engineering Sales Co., Atlantic, N.J.

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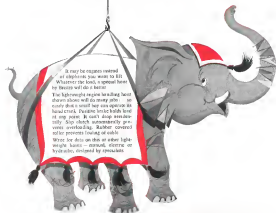
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LETTERS

From a Business Pilot

With reference to the lengthy letter "Business Plane Dregs," by A. J. Goss in your May 24 issue, there are some things that should be said.

The plane is, doubtless, right to be available for pickup in 1000 horsepower in the United States, but he seems to forget that there are 10,000 or more companies that need an airplane to fly between about 100 to 100 miles per day and day out. It is piloted by professional pilots but the business owner themselves.

And the more there are, more than 10,000 business owner pilots, the more it becomes more and more difficult to be more successful in the commercial and rapid transportation of private airplanes, even at higher rates, than they are in longer, slower and more expensive transportation plus the number of companies that are possible to use as well as transportation today.

For those of us that are flying our company owned airplanes day in and day out, the private airplane manufacturer does have a good job in providing airplanes right now. And the airplane that they have on the board on going to be decided upon.

The Beech Bonanza, for example, is not possible to get in a good 1000 700 miles away but for those in those few days with the ready.

The new Cessna 440 Twin Turboprop and Piper Apache are going to improve the utility of business flying.

The day will come, that most business pilots are looking forward to when we will be able to fly out over 4 to 6 plus per hour at speeds up to 350 mph.

The only way that airplanes will be available to both business and private operators of reasonable cost will be through volume large enough to cut production costs. I think that we could easily predict that the \$40,000 airplane will never be built in quantities of 1000 to 10,000. On the other hand, airplanes in the range of \$10,000 to \$20,000 could be built in substantial quantities and could be sold to the increasing number of business owner pilots.

Karl Cook, President
Karl Cook, Inc.
NRA # 1161415 Oxnard Field
Broomfield, CO 81001

Super Dart Pedigree

With reference to the letter from Peter M. Brown in your May 17 issue containing my Super Dart airplane, I would like to thank some manufacturers that he holds.

This airplane is not a result of "a weekend" 1450 airplane in the states, but was completely built up from new materials in approximately 2,000 hours of my spare time. It was flown for the first time in August 1955. The general arrangement is closely based on the Dugas Dart but the ship was entirely redesigned structurally and newly specially to meet CAA requirements.

Some of the main differences from the original design are increased wing and wing area, modified wing planform, NACA 4400

series airfoil instead of DGA 45, ducted tail cone, increased tail area, redesigned other structure, Westinghouse type landing gear, and 51-hp Lycoming engine installation. The ship was built for my own use, purely as a hobby.

It is surprising that Mr. Brown's response is so different. They are really a lot of it in 1 hour for his own house within 2,500 miles of it.

John Muller
Box 185
Hawthorne, N.Y.

Slow Production

In your Apr. 15, 1954 issue of Aviation Week and Space News, "The Future Developments New Production Plans," you show a chart of the delivery schedule of new aircraft. You do not show the schedule for the new aircraft. It is not possible to get in a good 1000 700 miles away but for those in those few days with the ready.

The Wright Air Development Center is doing well in the production of the new aircraft. It is not possible to get in a good 1000 700 miles away but for those in those few days with the ready.

Chrysler Tools 14-0012
Long Tools 14-0012
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14-0012

Robert F. Brown, Jr., Colonel, USAF
Director of Flight and All Weather Testing
Wright Air Development Center
Wright-Patterson Air Force Base
Ohio

[The chart accompanying the article on the USAF new aircraft production plan was omitted in our May 1954 issue.]

Private Enterprise

Thank you for the issue of May 20 in which I studied the editorial page of the May 24 issue of Aviation Week. I am glad to see that much more is being done on the production of new aircraft. I am glad to see that much more is being done on the production of new aircraft. I am glad to see that much more is being done on the production of new aircraft.

Many thanks for the recognition which you have given to our effort.

William M. Brown, President
Brown Aircraft Co.
Post Office Box 1007
Seattle 14, Wash.



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object of tests and profits was very helpful to you here, that is a subject that is left only to get generally indicated, but one that we think is rather important in the large-scale health of our industry and thus for our national defense.

Thanks, too, for the various news and feature articles that appeared in the same issue on the subject of the jet Stateline prototype. Please pass our thanks along also to Bob Baker.

There is great reflection here for the new Stateline. We are all looking forward to seeing it in the air.

HAROLD MOSKOWITZ,
 Director of Public Relations
 Boeing Airplane Co.
 Post Office Box 11127
 Seattle 15, Wash.

I have just sent the current issue of you will know publication and want to express our appreciation of your fair and objective handling as our true readers.

CARL M. GLOVERMAN, Manager
 Public Relations & Advertising
 Boeing Airplane Co.
 Post Office Box 11127
 Seattle 15, Wash.

Engineering Forum

In your May 17th edition of *Aviation Week* I was again reminded of a possible black spot in the public's memory.

I see the article in the last edition "The missing Penns" where Leonard S. Huber spoke on jet engine history. He was never to mention the turbocharged turbo prop which is still to be seen at the airport adjacent to Milan. Didn't the ship fly over before the Crown Hotel, which is called to the British first class. Finally, I don't remember but I would be interested in what your research says up.

ALBERT L. WOLFE
 Packard Building
 Philadelphia 2, Pa.

(Caption: Concept C-22 first in August 1958, one year after the *Winged Flight* event to it was a successful design engine test run, although the final output was jet thrust—Ed.)

Praise

In reading your Apr. 25 edition, I thought you might like to know some of the other names *Aviation Week* runs into on my bench.

First, it keeps me heavily interested in all aviation matters. You know why—this is a real job.

Second, thanks to your unique editorial policy and Phil Klein, I very frequently receive editorial, sooner, an interesting article from your *Aviation* section than by several electronic industry publications and contractors in my business. On several recent occasions, I have consulted *Aviation Week*'s articles among our top executives.

Third, we have a free paper and one with a completely "free" on airplanes in its old name. We publish *Aviation Week* to all other being impressed—especially seeing that we're in the air.

"Out of the mouth of babes"—indeed!
 ROBERT BAKER
 75 Temple Way
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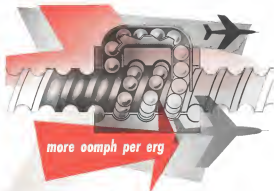
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AIR TRANSPORT

Braniff Weighs \$5-Million Panagra Offer

- Merger of Latin American operations would speed decision in the long-delayed Balboa service case.
- Quick CAB approval is expected in light of strong Presidential policy favoring such consolidations.

By Frank Shea, Jr.

THE AMERICAN-GOEC AIRWAYS, fast-making what could be the key to solution of the perennial Balboa through-service case, has offered to purchase physical assets of Braniff Airways' international operations in exchange for \$5 million in stock of Pan American World Airways and W. B. Grace & Co., its rival.

Braniff's board of directors had the proposal under consideration last week, and estimates release that the majority looked upon it favorably.

General industry feeling is that the offer, if accepted and approved by Civil Aeronautics Board and the President would solve what had appeared to be an intractable situation.

► **Sharp Steps**—Panagra's move stems directly from a CAB proposal that recommended more lines of service between Panagra's South American base in Lima, Peru, to intermediate points in establishment of a single independent airline (Aeronautics Week Apr. 5, p. 14).

The recommendation was considered a sharp step at Pan American and Goetz, since it left no doubt that CAB already had assumed this gift as the greatest asset available that tends to divert back companies of control of Panagra. The Board listed the proposal as one of the outstanding factors for its consideration, and therefore called for an "independent" ruling.

CAB went in its sharp criticism as a result of the "quality control" policy, with several senior officials calling the recommendation "the most serious move made by the Board in recent years."

► **Sound Proposition**—On the basis of this attitude toward PAA and Goetz, criticism before the Board will be anything but enthusiastic over the Panagra proposal, because it would benefit the airline's competitors.

But, it is pointed out, Panagra's purchase of Braniff's South American operations would serve to benefit all concerned. Further, such a move is considered to be in direct line with the Administration's thinking as evidenced in the recently released Civil Air Policy Review prepared by the Air

Coordinating Committee and approved by President Eisenhower (Aeronautics Week May 1, p. 12).

The Administration's policy specifically calls for reduction in subsidy burdens to the taxpayer, and the merger of uneconomical operations with those of stronger airlines. Since Braniff's international service has been a losing operation since its inception, it leaves no reason to the taxpayer, general feeling is that the purchase by Panagra would be a sound proposition.

Industry reaction to the President's policy report, Panagra's proposal probably would not have stood much chance with the Board. But now, observers say, CAB probably will have to go along with it, because it is basically in accord with announced Administration policy.

It also has been pointed out that, with several of its members up for appointment in the near future, the Board is not likely to oppose the Administration at this time.

► **For Offer**—A Panagra spokesman says his company considers the offer to be "unusually fair and reasonable" from the standpoint of Braniff's stockholders. He adds that, if carried out, the purchase would reduce the amount of subsidy now being paid to sustain U. S. flag airline operations in that area and thus encourage competition and "ultimately in the public interest as well as Braniff's stockholders."

The Board's next step would be taken over by Panagra consist of ac-

craft and ground facilities used in inter national service, valued at approximately \$5 million.

► **Cash at Stake**—Panagra says Braniff would receive approximately 215,000 shares of PAA stock and 71,500 shares of Goetz stock, at each in lieu of stock to the extent that Braniff might elect. Pan American would purchase from Panagra about one-half of the Braniff assets in cash.

Should the PAA and Goetz stock be distributed to Braniff holders, each owner of 51 shares of BNP stock (which a recent market value of approximately \$190) would receive two shares of Goetz stock and one of PAA (bearing a total market value of about \$170) and still retain his interest in some seven-eighths of Braniff's investment.

Panagra says that from an overall company standpoint, it is against a present aggregate market value of approximately \$30 million for all its assets, Braniff would be receiving \$5 million in marketable securities for about one-eighth of its assets.

The airline also points out that the 1953 earnings of Pan American and Goetz stock, aggregated to 32 cents for each Braniff share outstanding, exceeded the 1953 earnings of \$1.00 for Braniff for three of the last five years.

The corresponding dividends are equivalent to 21 cents per share of Braniff stock and compare with no dividends in 1949, 21 cents in 1950, 58 cents in 1951 and no dividend for either 1952 or 1953.

► **Low Subsidy**—making its offer to Braniff, Panagra placed particular emphasis on the Administration's new end to subsidy, citing the opinion that calls for "keeping international subsidy commitments as low as possible through development of the most economical route policies, or circumstances, where it now exists, of uneconomical competition between U. S. flag services."

► **Quick CAB**—Panagra expects the President's offer and a CAB and Presidential approval follow, the Balboa through-service case should be well on its way to a decision after more than three years of hearings and negotiation.

General feeling is that the long-awaited exchange agreement between PAA, Panagra and Eastern Air Lines involving portions of their direct service between New York and Lima, C. Z., also might be passed. This, too, would be in accord with the Administration's civil air policy.

Panagra DC-7s

Panagra has concluded a \$5-million contract with an New York bank to finance the purchase of five DC-7Bs, on order since last September (Aeronautics Week Sept. 28, p. 16).

The aircraft are scheduled to be placed in operation in mid-1955 on the airline's El Estero American service to the west coast of South America to Buenos Aires.

Panagra estimates the DC-7s will cut more than two hours from New York-Buenos Aires DC-4 time.

An Overhauling Committee policy of eliminating the local service routes.

Since Southwest is one of our best local service carriers, it would seem that the majority would wish to believe that portions of the AGC policy study which would look toward the impairment of Southwest's economic position is that it can continue to show progress toward self sufficiency.

"This evidently means that from now on, on each local airline certificate received our cases up, the majority may be expected to support also the removal of the route of eliminating the local service operations. Local service carriers in addition to Southwest who may be faced with this action in the immediate future are West Coast, Trans-Texas, Lake Central and Pan American.

► **Agreement**—The "policy" study committee United has not shown good cause for waiver of the Board's rules of practice in timely filing.

"It is, however, significant that United's application has been put into the Southwest record now, by the majority on its own initiative."

The majority order states: "No finding as to the Board's action in lowering the scope of the certificate not contrary to any degree a tentative or preliminary determination that the certificate of Southwest will not be renewed in that no part or parts in Southwest's present study will be transferred to a franchise carrier."

Dayton Taxes Airlines 20 Cents Per Fare

In an attempt to make a profit at Dayton's Municipal Airport, Dayton city government have approved a plan to assess airlines passengers and cargo that are carried by airport taxi.

The city's City Manager Herbert W. Wright's authority is complete with the order to collect 20 cents on every passenger brought into the city. For passengers in only using the airport would be charged 15 cents, according to the proposal.

By these measures, it is hoped to make a net profit of about \$50,000 on the airport for 1954. Operating costs for the year will be approximately \$100,000.

NWA Super Conies

Northeast Great Airlines will put out of the Super Conquesters on order from Lockheed Aircraft Corp. into operation as soon as northern route flights permit.

The U.S. carrier has told the other two Super Conquesters to Queen Empire Airways.

Effect of Higher DC-6A Load

The effect of a 25% increase in maximum gross fuel and landing weights of the DC-6As:

Aircraft productivity	Present weights	5% increase
Maximum payload	36,390 lb.	35,145 lb.
Maximum weight for maximum payload		
Load	2,290 lbs.	1,790 lbs.
Average section block speed	230 mph	203 mph
Miles per year	773,600	713,000

Direct operating costs	Present	5% increase
Cost per mile	\$1.38	\$1.48*
Cost per year	\$775,000	\$835,000

*Based on one mile increase by 25% to seven of 25% decrease in block speed. Weight of the Boeing plane that over-weights by 30% would result in maximum gross weight of 38,000 lbs.

From the Douglas Aircraft Co.

Tigers Ask DC-6A Payload Boost

Airfreight line says transport can operate safely with 14% more cargo, works year's test to prove it.

A one year exemption from Civil Air Regulations that will permit a 14% increase in payload on the Douglas DC-6As says transport is being sought from Civil Aeronautics Board by the Flying Tiger Line, Inc.

The application, on which CAB's Bureau of Safety Regulations made recommendations to the Board last week, asks for authorization to operate the aircraft "with an increase in the maximum loading weights and the maximum net fuel and oil weights to 107% of the maximum certified weights permitted per passenger aircraft."

► **Profit Income**—According to figures compiled by Douglas Aircraft Co., the proposed weight increase would pay for itself in 1954 in 14.6 days.

If the aircraft is flown a typical 775,000 miles a year with an 80% load factor, it is estimated that it will increase the annual operating profit for each plane by \$30,800. If the plane has a 100% load factor, the additional profit will exceed 50% of its original cost.

Flying Tiger owns five DC-6As, all of which have been leased to Northern Air Lines. The company has two more on order and will acquire an additional two when the merger with Shel Airlines is completed.

Only after the increase in the cargo capacity of the DC-6As on Pan American World Airways and American Airlines. ► **One-Year Test**—In the application, Douglas says the Board may T. Flying Tiger give an interim way the company should be given a year's test to prove it.

► **Engineering** soundness of the aircraft can be shown during a one-year trial.

The economic advantage is important "in the context of a profitable, self-sufficient industry."

► **No increase in maximum takeoff weight** is requested.

► **No change** is requested in square feet for performance and landing distances.

► **Douglas will supervise** periodic inspection of the aircraft structure as per program ordered by CAB. The Board will get a report on these inspections before the exemption period ends with a report for continued increase weight as justified by the results.

► **Douglas says a trial period** of one year is advisable and that "any other action by the safety of the aircraft."

A supporting letter from Douglas, signed by vice president-in-charge A. E. Remond, says that one-year trial requested by Flying Tiger is the "only practical method of proving the safety of the aircraft." The letter says that the weight increase from the 14% that was established for commercial passenger planes.

In another study submitted to the Bureau of Safety Regulations, Remond says the proposed 7% increase in maximum gross fuel and landing weights would mean the aircraft will be able to fly with the DC-6A was dropped would be out from 2.5 to 2.4 ft. In calculations show that, operating with maximum weight, it will be necessary to reduce CAA's required rate of descent from 10 ft. per sec. to 9.25 ft. per sec. in order to maintain proper load on the landing gear.

The Air Line Pilots Assn. has filed a request to postpone in the case.

Senators to Study Nonskid's Role

Committee asks details of North American Airlines' operation as Gurney, Murray clash on McGowan Bill.

The role of North American Airlines in the transportation network, now under consideration by Civil Aeronautics Board, will be reviewed by the Senate Interstate and Foreign Commerce Committee before Congress adjourns. The move to study the long-sought move made by Sen. Andrew Schepke. Pointing to a chart of North American's complicated corporate organization, Schepke declared that he could "not see how the Board could be in any other position than a line of administrative difficulty" in endeavoring to enforce rules and regulations on the airlines.

The chart was presented to the committee on Air Transport Act (Senate Report No. 26, 86). ► **Plan's Fault**—The Senate Republican then mentioned two actions.

► **He requested the Board** to submit to the committee the complete background on the North American case and data apparently aimed to show that scheduled airlines are offering coach service to all the "short" routes served by North American, as well as to common carriers.

► **Specifically**, Schepke requested a "detailed study" of scheduled operations from their cost to the present the number of other airlines that have been scheduled routes, the number of other airlines that have been scheduled routes by North American's competitors—American Airlines, Eastern Air Lines, National Airlines, Trans World Airlines, and United Airlines. The number of other airlines that have been scheduled routes from their cost to the present, the number of other airlines that have been scheduled routes from their cost to the present.

He also used by details on the 1953 operations of North American and each of the domestic trunk lines showing the number of cities served, the passenger and revenue statistics, and the average length of haul of each airline.

► **Schepke said he would ask** Board enforcement officers to appear before the committee to answer a series of questions. Among the questions were: "What is the Board's policy on the enforcement of the law now effectively?"

► **Gurney vs. Murray**—Schepke's request was made during testimony by Chairman Charles Gurney on the omnibus McGowan Bill regarding civil aviation law.

He differed with Administration testimony by Commerce Undersecretary for Transportation Robert Murray on the basis that the Board's role is to be studied.

► **New types of service**—Gurney suggested provisions of the McGowan Bill (liberalizing the authority of the Board

to issue certificates for new types of services but not to set up the Board in this function. Murray took the position that the Board's present authority is adequate.

The McGowan Bill would authorize the issuance of three-year certificates for "improvements" services without a showing of "public convenience and necessity." The Undersecretary said this is essential, but Gurney declared that this approach is "unusually sound."

The McGowan Bill would have experimental certificates that duplicate existing routes. This, Gurney maintained, would defeat the objective. He pointed out that any type of service, such as all-night operation or all-season travel, might duplicate the service of existing carriers and yet be new experimental service.

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On the contrary, Gurney declared, "the statute, in part at least, has a role for the Board in the future government, and it is only illusory to say that the measure of authority should be subject to approval of the Board in order to assure that current government and industry policy will not be lost to the government through industry built up."

He said he tentatively represented the committee's view of CAB with one exception: Board member Joseph Adams differed with the recommendation of the same regulation of air carriers. Adams is scheduled to testify later before the committee.

Gurney particularly emphasized that CAB should be given authority to set maximum rates for air contractors on Defense Department business.

The objection for this traffic is that it is a "badly designed" law. "Under this action may tend to cut their charges for transportation service to the very minimum. The situation is such as to give rise to a possible loss... that any carrier who is not a member of the Board and that by the Board, the action of their operations will be jeopardized."

► **Rules of Need**—Other points made by the Board chairman.

Air carriers no longer should be eligible for government subsidy as a basis of "aid," as under the 1938 Civil Aeronautics Act. He urged legislation reinforcing the Board to provide, in addition to the "aid" of the Board, and accordingly, "the total subsidy possible in any one year—over if such amount was insufficient to satisfy the entire need."

► **Costs as index** has passed through the committee stage and has reached the Senate. Gurney said, "The economic self-interest of the Board is to be the right to be eligible for subsidy over it might again return to the 'aid' clause."

► **A new type of "regulated air carrier"** should be established with "limited" certificates specifying the service these airlines would be authorized to perform.

► **Field of scheduled** franchise service appears to be limited, Gurney said, "the field of supplemental service does not appear to be." He referred to the McGowan Bill's approach, establishing a category of "single air carrier" and suggesting that they be certified. This still would leave the Board with "one of the greatest problems facing regulatory provisions," he said.

► **What is necessary** is the ability to impose any type of limitation or condition as to the limitation to a proved need. It should thus be possible to limit frequency of schedules, to provide for type of equipment to be used as well as the points to be

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served and the specific type of service to be offered."

- There should be no "wholesale" rewrite of civil aviation law, as proposed by the McGeehan bill. The 1934 Act should stand, and subsequent amendments be considered desirable should be made.
- There is no need for creation of an independent air safety board to separate the safety investigating and safety rule-making functions.
- There is no conflict of interest between true accident investigations and safety rule-making responsibilities," Conroy declared. "A truly impartial investigation does not seek to deal with 'blame' but rather to determine how the accident occurred, in order to prevent future accidents."

"The airlines' safety record," he said, "certainly does not demonstrate any need for changing the present safety investigation setup." In 1952, he reported, deaths per 100 million passenger-miles of 52 on the scheduled airlines compared with 3.9 in automobiles and 3.0 on buses, 1.0 on boats, and 3.4 on railroad passenger trains.

The fixed task on page 4 on the McGeehan proposal to merge Civil Aeronautics Administration and CAB into a single member civil aeronautics authority, Conroy said, because of the personal interest of the members in such a change.

ATA Maps Program For New Airline Gains

The airline industry is making a strong effort to increase long-haul passenger traffic and needs new equipment to make a bid for the short-haul market, says Stanley Conroy, assistant to the president of Air Transport Association.

ATA, set scheduled with 70 out of over 100 passengers traveling over 1,000 miles," he told an ATA dinner for "System Written Asia," a convention at Miami Beach, Fla. "We're going to try to get all of them on jet-class or more."

"Who else would we put coach service into class to 100 miles economically and over 35 foreign and overseas ports?"

On the short-haul market, Conroy says airlines carried only 9 million of the 47 million passengers who traveled less than 250 miles in 1953. Given the rapid equipment, he adds, "we can save miles that market."

• **Positive Steps**—The ATA urged the air transportation industry also to study, to:

- Find new markets.
- Save the public to determine why, where, when and how people travel and what can be done to change their travel habits and attract them business.
- Explore the untapped potential mar-

ket, with the prospects of new cargo equipment.

• **Problems**—Conroy said the program to increase airline business is long term to meet changing expenses that have kept traffic heavily down, having resulted in higher net income for the carriers.

In 1954, he forecasts, it will cost the airlines 65 cents for every dollar's worth of traffic produced.

Conroy says the air carrier also must find a way to increase their other services.

• **Problems** and basic instability of the traffic market since World War II, despite numerous upward trends, have prevented the industry from accumulating necessary reserves.

• It is estimated that a 3% drop in load factor during 1954 will decrease net operating income by more than \$12 million.

• In 1954, the industry probably will pay \$1.82 for goods that sold for \$1 in 1953; prices have increased from an average index base of 100 in 1938 to 231 in 1954.

• **Partisan Complexions**—Conroy charges that the government approval of new aircraft makes a problem "in bringing new to bear as a political maneuver."

He says that is essentially dangerous because of styles at the concept of regulatory administration.

"The administrative process is a quasi-political approach to problems which require specialized talents and scientific facilities," he says. "In aviation for long and its success derive from the control done to ensure the functioning of industrial policy from political substance."

• **Needed Aides**—The ATA executive describes the Air Consulting Committee's Aviation Policy Report as good as the whole.

But, he says, "No part of the ACC report will allow greater choice than the committee's recognition of the needs of the non-scheduled airlines' unsaturated and fluctuating transportation of the such transcontinental and north-south routes."

"The mistaken problem is just one of many long ahead for the industry. It needs emphasis the value of an transport development to a greater extent along the traditional routes of the nation and understanding the problem of necessary and continuing support of marginal and unprofitable cities by such traffic-producing metropolitan areas."

"The extent of the need to maintain regulation to strengthen not this balance and the need for government understanding of this problem is evident from the fact that, in 1953, despite regular service by all domestic airlines to 560 cities, 25 key airports produced 68% of all the passengers."

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EDITORIAL

Low Fares Win the Millions

We believe the Civil Aeronautics Board is right in its decision against excessive passenger fare increases at this time.

With thousands of additional seats to sell on an expanding fleet of airlines in coming months, it seems a strange time to raise fares. Road buses show we are not selling money more than half of the seats that are available even today.

There is no question that the industry will have its financial problems in the coming year. But growth pains are more tolerable than the cranks of decay. Let's take the long-range view.

Rampage cannot help but drop in profit per passenger in less than a day of a higher proportion of first class passengers, in smaller aircraft with fewer seats.

In 1954, the airlines expect it to cost them 96 cents for every dollar's worth of traffic produced. But there is growing realization that the profit rate must be subordinated to the job of filling these additional seats and building an even larger market that will be reflected in a return that takes to the air at every opportunity.

As the CAB put it so well, "while unit costs have remained stable or slightly declined, and while traffic has continued to increase, load factors and, as a result, earnings, have declined."

"In a situation where industry earnings appear to be declining primarily because the growth of industry capacity has temporarily exceeded the growth in its traffic, it would appear to be premature to rank into a consideration of fare fare changes as a remedy for the delinquent."

The Board then answers the frequent plea that "rising costs" require higher fares. Nothing could be done that would help quicker the current amazing trend to air travel than a fare increase.

Industry's big job is to sell seats. Higher fare brings no more revenue from an empty seat. Leaders like Eastern's Rickenbacker and TWA's Dawson know this well. They are not lowering the "rising costs," although they know full well that their unit profit per passenger is sliding. Barring a war, the good old days of high fares are over, forever.

Now it is a matter of filling the seats we have, and then we add in coming months. That means selling.

Despite reports that some effort may be exerted to get CAB to reverse its stand on fares, a policy statement

indicates that instead of copying the Blues over lower unit profits, the Air Transport Association is beginning to grasp its opportunities to win some millions of cents to fight.

It is embarking on a positive program.

Its spokesmen are beginning to reflect confidence and optimism of the future that can be clutched in the coming year. It is showing evidence of looking at the bright side of the revolution that is underway in American transportation.

"We know where we're going, and what we've got to do," Stanley Gershte, ATA's assistant to the president, told the Aviation Writers Association Convention.

"First off, we intend to penetrate the existing overseas carrier market on long hauls. We're not satisfied with 71 out of every 100 passengers traveling over 1,000 miles on all overseas carriers. In 1955, we collected 85 cents out of every dollar spent in that travel area."

"Then we're going out to find new markets. We've made a magnificent start in that direction. This year, we're going out, in conjunction with some reputable ferry groups, to find out through intelligent depth interviewing why, where, when, and how people travel and what we can do to change their travel habits and attract their business. . . ."

Last year, Mr. Gershte noted, the airlines earned more people more miles more quickly, providing more adequate service, but only 65% of the airline seats were filled.

"That is the face of the prospective delivery of \$70 new, large aircraft in the next 18 months." Even so, a conservative average of 55 seats on each plane, that is 9,500 more seats to sell with each one way flight made by this new fleet.

The ATA realizes the industry must survive high profit rates in the coming months of a difficult period in order to build America into an air-traveling public whose millions will offer a market of broad and stable base, and eliminate for all time as serious competition the longhaul bus, train and ship.

Some airlines will experience acute difficulties. The sales potentials in some regions are admittedly lower than in others. The pinch inevitably will bring mergers and some major readjustments in the airline map. But these must necessarily give way to the enormous growth in commercial air transportation that is already upon us.

—Herbert H. Wood

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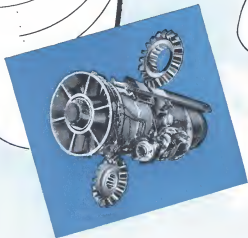
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